Appendix B3

Annual Review of Portage and Goose Pit Slope Performance

AGNICO EAGLE
MEADOWBANK

REPORT FOR

2017 Annual Pit Slope Performance Review

Meadowbank Mine, Nunavut

DECEMBER 22, 2017

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EXECUTIVE SUMMARY

An annual site visit to inspect the performance of the pit walls of the open pits at Agnico Eagle Mines Ltd.'s (AEM) Meadowbank Mine was carried out by Tetra Tech Canada Inc. (Tetra Tech) during the period 25 September 2017 to 28 September 2017. A detailed summary of recommendations is presented in Section 9.

Included in the review this year was the Ground Control Management Plan (GCMP) and ice wall inspection program. New data for review included instrumentation installed in Pit E5, and at the Vault Pit. The initial exposure of rock at Phaser Pit was reviewed during the site inspection.

PORTAGE PIT

The Portage Pit is subdivided into 5 pits, labelled A through E from north to south.

PIT A

During the site visit, mining was underway at the north end of Pit A, with plans to complete mining of the pit in Q1 2018 along the west side. The upper benches of the north through northeast, and east wall are performing satisfactorily. The upper west wall has not experienced any failures following the September 2016 event. An attempt was made using air bags to dislodge some of the rock block on the upper west bench along an exposed tension crack. This was unsuccessful, indicating general stability of the block. Nevertheless this area should continue to be monitored. A wedge approximately 179 t failed on the lowest bench at the north end of the east wall. Additional wedges of similar size were noted along this bench. These were scaled out as the pit was mined down.

The lower benches of the west wall were noted to be performing well. However, an area for observation was identified and defined by a steeply inclined plane oblique to the wall which could result in on-going raveling and rock falls. A potentially de-coupled block was also identified for continued observation.

PIT B (B DUMP)

The Pit B (B Dump) geometry remains unchanged from the 2016 site inspection. The segments of the east and west walls that are exposed are performing well, and there are no significant geotechnical concerns. Benches are generally clean and free of any material accumulation. The B Dump is performing well. No tension cracks were observed on the crest platform nor were signs of deformation of the dump toe or dump face.

PITS C AND D (C AND D DUMPS)

The west and east pit walls of Pits C and D are buttressed by the C and D Dump. There has been no substantive change in the geometry of C Dump since the 2016 site inspection. D Dump continues to be active. Some tension cracks that were deserved in 2016 at the eastern margin of the lower platform where it abuts the adjacent rock benches were observed again in 2017 with no apparent change. No signs of deformation of the dump face were observed, nor were tension cracks noted.

PIT E

The east wall of Pit E continues to perform well, and there is little year-to-year accumulation of material on the benches.

An alternative mining plan for the wall was developed by AEM which involved the pushback of the Pit E5 south wall into more favourably oriented stratigraphy, and less structural complexity. The results of a geotechnical field investigation and office study indicated overall slope stability for the proposed pushback, and minimal horizontal displacements beneath the Bay Goose Dike. The installation of specific instrumentation behind the wall, including time domain reflectometry cables, piezometers, thermistors, a slope inclinometer, and prisms was recommended. With the exception of prisms AEM have installed and are monitoring the recommended instruments.

A review of the available data show no sign of deformation in the slope. Several of the piezometers installed behind the crest show a response to drilling and blasting at the toe, which is consistent with the conceptual hydrogeological and engineering geological model understanding. In addition to the instrumentation, the slope is continually monitored using a GroundProbe radar.

During development of the south wall ramp a number of slab type failures along foliation have developed, resulting in several rock falls. AEM have been mapping the ramp as it is advanced, using a LiDAR scanner.

There are two specific areas of the south ramp that require ongoing monitoring. The first is a potential wedge (south ramp wedge) formed below the ramp at the entry of point of the ramp to the south end of the pit from the west crest. There is loss of bench crest below the rap, and the accumulation of material on the platform below. The second area is at the eastern end of the ramp, at the switchback, where a number of outward dipping planes (southeast wall planes) are noted. It was recommended to include both areas in radar monitoring coverage.

PIT E WEST WALL RAMP

Seven areas of potential instability observed immediately adjacent to the West Wall Ramp continue to be monitored. No indications of instability since the 2016 inspection were noted. The rock fall containment berm constructed along the west edge of the ramp continues to provide adequate catchment for rock falls that might occur along the west wall above the ramp. As the ramp descends south along the west wall into the base of Pit E3, it becomes single lane to accommodate the width of the containment berm adjacent to the bench. A buttress constructed down slope of the ramp provides additional support to the ramp.

PIT E SLOT SOUTH AND EAST WALL

The slot mined at the south end of Pit E has been partially filled with waste rock pushed over the edge of the pushback area as it is being mined down. The slot area is currently closed. Consequently, the hazards associated with potential bench scale instability within the lower portions of the wall have a low associated risk.

PIT E INSTRUMENTATION

The TDR, thermistor, piezometer and inclinometer data from instrumentation installed behind the south wall of Pit E in 2017 were reviewed. The instrumentation is connected to an Automated Data Acquisition System. The TDR cables show no displacement. The two thermistors confirm the presence of a talik behind the wall. Nested piezometers were installed in 5 locations.

A review of the piezometer data showed a response in one piezometer to drilling of a blast pattern at the toe of the slope and characterized by a 50 m drop in pressure head with a relatively rapid recovery. Three nearby piezometer nests did not respond in the same way; however, the three did respond to the subsequent blast with a rapid increase in pressure head. A similar response was recorded during the summer, however this was not investigated in detail by Tetra Tech during the site visit. It is understood that AEM frequently monitor the instrumentation and investigate all events. Some of the piezometers appear to be on an upward trend, and so the instrumentation data should be reviewed more frequently and in greater detail to understand if this trend is real. AEM have indicated the upward trend in the piezometer data is most likely related to the advancement of permafrost into the wall, as indicated by other instrumentation both in the wall, and in the dewatering dike.

One In-Place (IP) inclinometer was installed in a dedicated borehole behind the wall. AEM noted that the data are questionable after May 1 2017, as a result of a malfunctioning thermistor at Sensor 16.

GOOSE PIT

The north, south, east, and west walls of the inactive Goose Pit continue to perform adequately. There is no observable year-to-year accumulation of new material on the catch benches. The pit lake elevation at the time of the site visit was 5065 mRL, compared with 5047 mRL during the 2016 inspection.

End dumping of waste rock to the northwest corner of the pit near the access ramp entry point (North Dump) was carried out in 2016, stopping in June of that year. Dumping recommenced in 2017 creating a second but contiguous dump south of the first (South Dump). Tension cracks have been observed in the crest area of both the North and South Dumps. AEM established a wireline extensometer across the tension cracks of the South Dump, and set trigger levels for appropriate response to indications of movement.

GOOSE PIT INSTRUMENTATION

The TDR, thermistor, and piezometer data collected from instrumentation installed behind the east wall of the Goose Pit were reviewed. AEM indicate that the TDR100 data logger used at Goose Pit has been moved to replace the broken TDR100 data logger at Portage Pit. The broken data logger is currently being repaired. AEM have added functionality to the instrumentation system through the addition of GeoExplorer software for easier access and visualization of data.

The TDR data remain unchanged from previous years. The thermistor data is generally consistent with previous years, although GPIT-14 shows a slight cooling trend. Some of the piezometer data are unreliable as the tips may be frozen. The unfrozen piezometers continue to provide useful data.

VAULT PIT

Mining of the Vault Pit continues to advance rapidly. At the time of the site visit, the pit had been excavated to 5025 mRL. The pit walls of the Vault Pit continue to perform well, and as expected.

FOOTWALL (VAULT GRID WEST WALL)

The west wall is being mined on single benches and parallel to the dip of the stratigraphy. The wall is being mined as a series of single benches (7m high). The slope follows the inclination of the ore which is inclined to the east, parallel with foliation and stratigraphy. The design criteria for the wall was specified as single bench to accommodate the expected loss of some benches, and minimize the volume of failed material. There are no significant geotechnical concerns noted, and no evidence of large scale (overall slope) instability for the footwall slope.

SOUTHWEST WALL (VAULT GRID SOUTH WALL)

The stratigraphy intersects the south wall at right angles. A small sump is in the southwest corner of the pit and manages water in this area. Two outward dipping planes were noted above the sump area, forming shallow slivers of potentially unstable rock. The planes strike slightly obliquely to the wall, and while they are kinematically free on their north side, they do not appear to have a side release plane on the south side so the likelihood of failure is low. Nevertheless, it is possible with annual cyclic freeze-thaw that these could become destabilized and ravel. Since these features are directly above the sump area and associated equipment, and the area is regularly visited by personnel, these should be identified on a geohazard map for the pit and their presence communicated to anyone visiting the sump area.

SOUTHEAST TO NORTHEAST HIGHWALL (VAULT GRID EAST WALL)

The southeast to northeast highwall (grid east) is being mined down from the final crest position. The wall is performing satisfactorily. The final wall benches are being mined using pre-shear blasting methods, and are being excavated to 75-degree bench face angles on triple benches. Half barrels from the blast holes are clearly visible in the walls and there is very little deviation in the borehole traces. The benches are cleaned well, and there is no indication of significant raveling and no significant year-to-year accumulation of material on the benches. Catch bench widths are designed to 10.5 m. There is some over break of bench crests due to blasting but this is not significant. In general, the toe of the thermal capping material is greater than 2 m from the pit crest.

SOUTHEAST HIGHWALL (GRID EAST) SEEPAGE

An area of seepage on the southeast wall of the pit emanates from just above the 5109 mRL bench. The seepage results in the formation of a substantial ice wall during winter which presents operational challenges to the mining schedule. During the 2017 site inspection water could be seen flowing down the southeast wall from an area just above the 5109 mRL bench, and a significant portion of the wall was stained with iron oxide.

The water inflows to the pit from the southeast wall have been most problematic during winter, when a large ice wall is formed. AEM contracted an external consultant (Vertika) to provide advice on possible management options (Vertika, 2017). AEM have taken proactive steps to implement an ice monitoring program, including recording of ice wall conditions. A review of thermistor data behind the wall suggests that freeze back of the wall is occurring. During the site visit flow was still active and recent communications show ice is accumulating on the wall. The water level in Pond D should continue to be managed at as low a level as possible as piezometer data shows a correlation between Pond D level and water levels behind the wall.

HIGHWALL NOSE AREA

A rock ‘nose’ in the highwall near the northeast end of the wall is formed from a change in wall orientation. This sector of the wall was developed within permafrost. Widely spaced faults and open continuous joints dip into the nose area at steep angles which could conceivably lead to toppling. The competency of the intermediate volcanic rock at the Vault deposit, and the wide spacing of these features suggests this is unlikely to develop. However, this should continue to be monitored. There is currently one prism installed in this area and additional prisms should be installed.

VAULT NORTHEAST AND NORTH TRANSITION WALLS

Shear planes or faults parallel to stratigraphy intersect the lowermost bench of the grid east wall at the northeast end of the wall. The intersection of the shear planes with the wall may result in the development of small overhangs where rock blocks are separated from the top release planes formed by shears. This could be exacerbated by poor blasting methods, over-excavation, and plucking during excavation. Equipment operators should be reminded not to dig beyond dig lines, and not to pluck rock.

VAULT NORTHEAST WEDGE

A potential bench scale wedge was noted at the north end of the east wall, where it intersects the north wall at a right angle. This was discussed with AEM during the site visit for continued visual monitoring, and limiting access beneath this area of wall. Mining in this area of the pit is almost complete.

VAULT PIT SLOPE MONITORING INSTRUMENTATION

Following the 2016 field thermal exploration study, AEM selected three areas for instrumentation with piezometers and thermistors. The areas selected were areas where the thermal exploration study indicated talik conditions. The piezometers and thermistors are attached to data loggers, and the loggers are regularly downloaded and reviewed.

Prisms are being installed on the highwall slope face. An area of the highwall forms a nose due to the reorientation of the wall. A fault trends across this feature, dipping into the wall at a steep angle. While toppling failure is unlikely, additional prisms should be installed on this portion of the wall below the fault (currently there is only one installed).

PHASER AND BB PHASER PITS

Initial stripping of Phaser Pit began in September 2017; stripping at BB Phaser Pit has not started. A review of the available data for the Phaser Pit and BB Phaser Pit area was completed by Tetra Tech in 2017, and concluded it was appropriate to apply the same general slope design criteria as for the Vault Pit. Although rock exposure was limited during the site visit, and damaged by blasting and near surface weathering, the general orientation of the stratigraphy could be seen inclined to the east at a shallow angle, similar to the main Vault deposit stratigraphy. The general geological model for the pits is a strike-extension of the current Vault geological model. Visual monitoring and mapping should continue to confirm the design basis.

GROUND CONTROL MANAGEMENT PLAN

AEM have developed a comprehensive Ground Control Management Plan (GCMP) for the site, which is thorough and detailed in its scope, and practical in its implementation. The GCMP was reviewed as part of the site visit, and provides information relating to the engineering geological and geotechnical model for the Meadowbank Mine, including hydrogeological and permafrost conditions. Hazard identification and the risk assessment process is discussed, leading in to how geotechnical hazards are monitored and managed on site. The roles and responsibilities of key personnel are presented for clear communication. The GCMP provides for regular auditing and review of geotechnical aspects relating to operation of the pits, and of other infrastructure. Key Mine Act Regulations are included for information, and important safe work procedures and Trigger Action Response Plans are presented.

ROCK FALL DATABASE

A rock fall database is maintained at the site, and records rock fall events. The location, time and date and coordinates, rock type, estimated tonnage, whether the event was reported to the Mines Inspector, and whether the event was predicted by the radar system are recorded. The database was reviewed and is up to date.

ICE MONITORING PLAN (VERTIKA, INC.)

AEM have proactively worked with Vertika Inc, to develop an ice wall inspection program for the Vault Pit, to be implemented as part of the regular geotechnical inspections. This is a simple one-page form for carrying out ice inspections, and the ice inspection program provides some direction on characterizing and classifying ice.

GEOTECHNICAL MAPPING AND SURVEYING

Geotechnical and structural information should continue to be collected form all operational pits. This is most efficiently and safely accomplished using the Lidar scanner coupled with processing using MapTek I-Site Studio software. Any areas that may potentially pose risk of instability should be surveyed, and assessed.

Areas of seepage in the pits should be surveyed and compiled into the overall site geotechnical management plan.

AEM have indicated a move towards more regular reporting of instrumentation data combined with geotechnical inspections to better synthesize and summarize the useful data that are being collected.

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APPENDICES

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Agnico Eagle Mines Limited and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Agnico Eagle Mines Limited, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in the Appendix H or Contractual Terms and Conditions executed by both parties.

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was retained by Agnico Eagle Mines Ltd (AEM) to complete an annual inspection of the pit slope performance at the Meadowbank Mine, as a requirement under the water licensing agreement for the project. The first annual inspection was completed for the Portage Pit in 2010. In 2012, the Goose Pit was added to the annual inspections, followed by the addition of the Vault Pit in 2014. In 2017, excavation of Phaser Pit (a southward extension of Vault Pit) commenced, and the progress was inspected as part of the 2017 site visit.

The site visit was completed during the period 25 September 2017 to 28 September 2017, and included the inspection of general bench and wall performance of Portage Pits A through E, the Goose Pit, and the Vault Pit. At the time of the site visit, excavation of the Phaser Pit (a southward extension to the Vault Pit) had commenced, and the progress of the excavation was reviewed.

This report summarizes the inspection carried out for the pits and describes the performance of the various pit slopes through observations made during the site visit. Where possible the observations are related to the engineering geological model for the project. The observations also reference recommendations made during previous annual pit slope inspections.

As part of the site visit, the available instrumentation data for the Pit E, Goose Pit, and Vault Pit were reviewed. These data are presented in Appendices A, B, and C, respectively. A detailed analysis and assessment of the data is not part of the scope of work, however where unusual or anomalous results were noted, these were discussed with AEM and are reported herein.

The initial stripping of Phaser Pit was inspected as an extension of a review by Tetra Tech in 2017 of proposed design criteria for Phaser Pit and BB Phaser Pit. The review document is presented in Appendix D. The ground control management plan (GCMP) developed by AEM in January 2017 was reviewed, and a copy of the table of contents presented in Appendix E. AEM maintain an up-to-date rock fall log on site. This was reviewed, and is presented in Appendix F. Finally, AEM have completed a comprehensive back break analysis for many of the benches in Pit A, Pit E, and Vault. These were reviewed, and although not discussed in detail in this document, are presented in Appendix G. The back break analysis was used in the review of the proposed design criteria for Phaser and BB Phaser Pits.

2.0 CURRENT MINE STATUS

2.1 Portage Pits

The Portage Pit consists of five pits, identified as Pits A through E, from north to south. The general pit plan is shown on Figure 2-1.

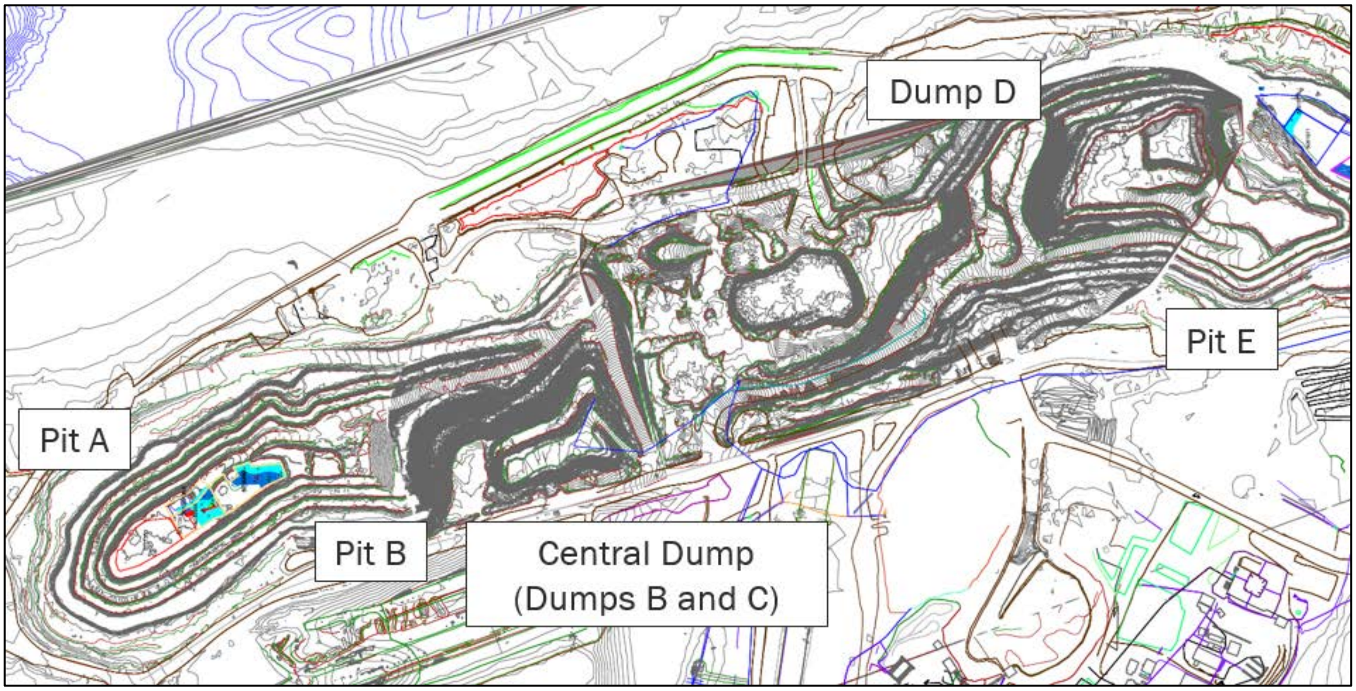


Figure 2-1: Portage Pit at the time of 2017 site visit

Mining at Pit A and Pit E (E5 pushback) was active at the time of the site visit. The geometry of the waste dumps in Pits B, C, and D have not changed substantially since the 2016 site visit. The current and planned dump crest elevations are shown in the following table.

Table 2-1: Pit dump platform elevations (Ref. AEM, September 2017)

Pit Dump	Platform Elevation During Inspection (mRL)	Planned Final Platform Elevation (mRL)
B	5145	5129*
C	5145	5129*
D	5127	5129*

*Reflects planned elevation at closure.

2.2 Goose Pit

The extent of the Goose Pit at the time of the site visit is shown in the following Figure 2-2.

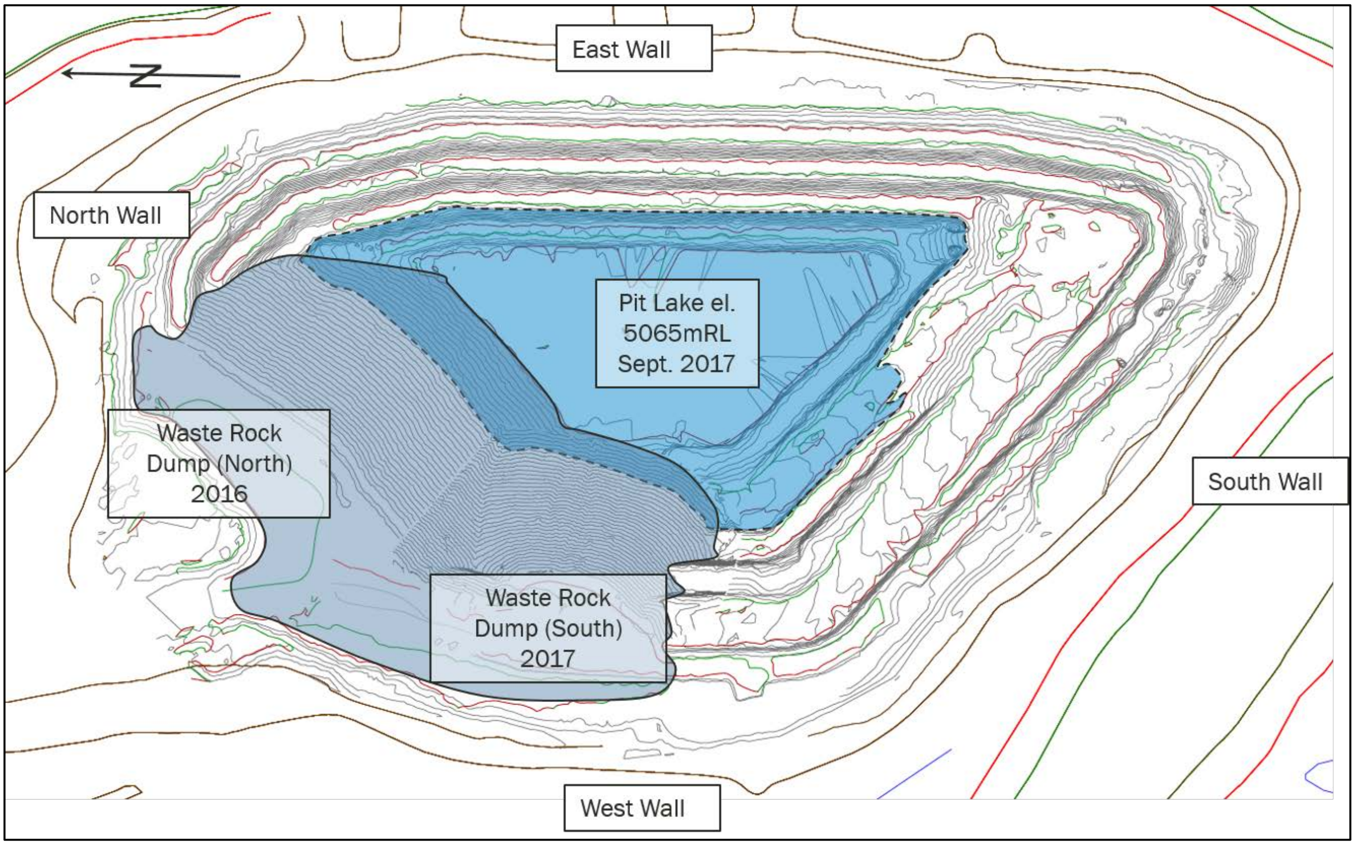


Figure 2-2: Goose Pit at time of the 2017 site visit

Additional dumping of waste rock advancing the Goose Pit dump southward has occurred in 2017, resulting in a North Dump and a South Dump. The pit lake elevation has increased by approximately 20 metres from the 2016 elevation and is currently at approximately 5065 mRL.

Table 2-2: Goose Pit dump platform elevations (Ref. AEM)

Pit Dump	Platform Elevation During Inspection (mRL)	Planned Final Platform Elevation (mRL)
North	5129	5129
South	5129	5129

*Reflects planned elevation at closure.

2.3 Vault Pit

The extent of the Vault Pit at the time of the site visit is shown in the following Figure 2-3.

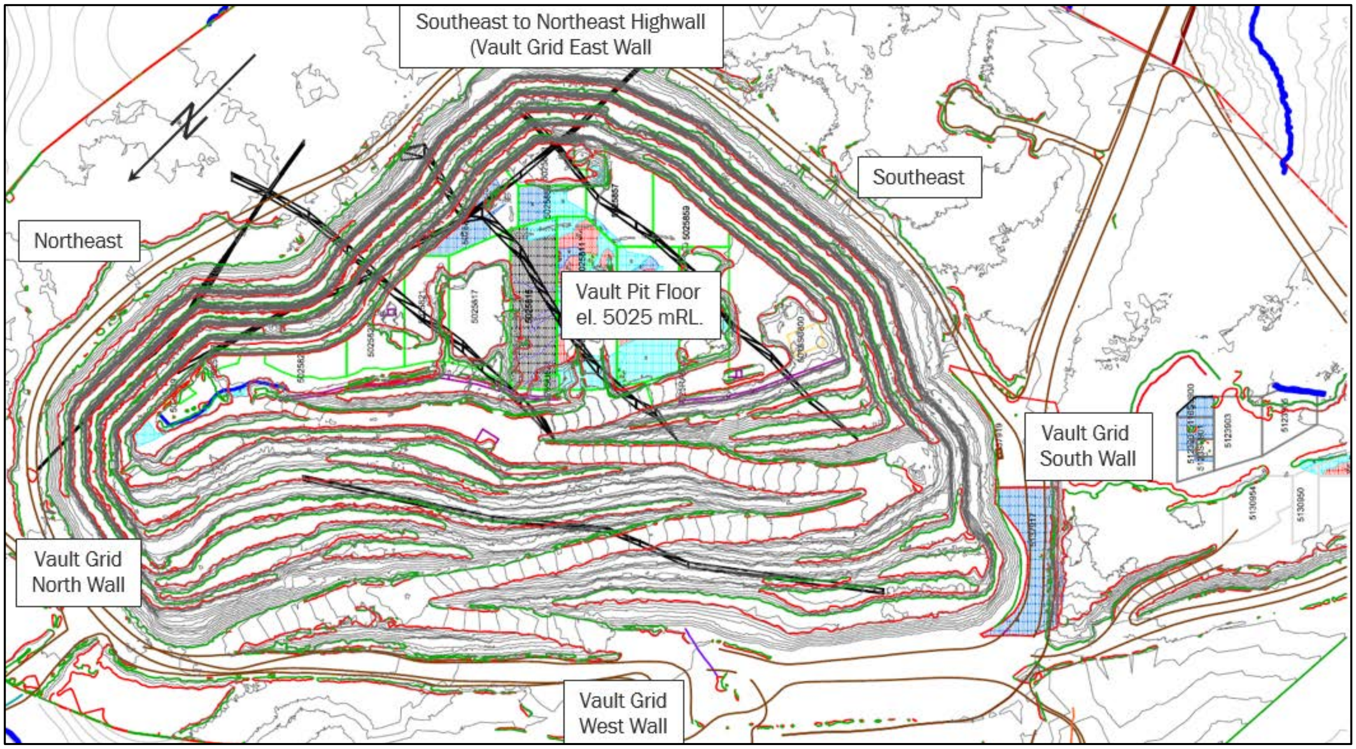


Figure 2-3: Vault Pit at time of 2017 site visit

2.4 Life of Mine Schedule

The current Life of Mine schedule for the various pits is summarized in the following table.

Table 2-3: Life of Mine Schedule for Meadowbank Mine

Pit	Current Floor Elevation (mRL)	Planned Final Floor Elevation (mRL)	Approximate Benches Remaining	Planned Completion Date
A Ultimate	5011	4997	2 (single)	Q1 2018
B	Backfilling			Complete
C	Backfilling			Complete
D	Backfilling			Complete
E Ultimate	5004 (E3) – 5074 (E5)	4976	5 (triple)	Q3 2019
Goose	Backfilling			Complete
Vault Pit	5011	4955	3 (triple)	Q4 2018
Phaser Pit	5123	5081	2	Q4 2018
BB Phaser Pit	Ground surface (5160 est.)	5088	2	Q1 2019

3.0 MINE SITE ENGINEERING GEOLOGY MODELS

The supracrustal stratigraphy of the mine area consists of ultramafic volcanic, felsic to intermediate volcaniclastic, and/or greywacke, interbedded magnetite-chert iron formations and associated pelitic schists, and quartzite. The bulk of the gold mineralization in the deposit is contained within the iron formations, except for the Vault Deposit where gold is associated with sericite schist.

3.1 Portage Deposit

The Portage Deposit area has undergone a series of regional deformation events resulting in typical 'dome and basin' fold structures. The dominant structural feature of the Portage Deposit is a gently to steeply inclined tightly folded north/south trending anticline which has resulted in the iron formation, interbedded volcaniclastic and metasedimentary rocks being folded around a core of ultramafic volcanic rock. Bedding-parallel foliation associated with the east-west deformational events is pervasive throughout the deposit area. This structural fabric has formed the basis for much of the pit slope design criteria, which avoids undercutting of this fabric. Foliation surfaces tend to be slightly altered with occasional coatings and can be associated with slickensiding and shearing. In general, the foliation and stratigraphy dip to the west at variable inclinations from horizontal to sub-vertical. Locally the foliation orientations can vary considerably, particularly adjacent to major fault zones.

AEM geologists report that up to four deformational events have been interpreted in the project area, resulting in very complex fold patterns and rock structure. This is particularly evident at the south end of the Portage Pit, in Pit E, where superposition of fold events has imparted a complexity to the rock mass that has led to single and multi-bench scale instability.

3.2 Goose Deposit

The Goose Deposit is a steeply dipping, stratiform gold bearing iron formation that is part of a sequence of Archaean ultramafic and mafic flow sequences, volcaniclastic sediments, felsic to intermediate flows and tuffs, and sediments. The ultramafic rocks are variably altered and contain serpentine, chlorite, actinolite, and talc. Through the central core of the deposit, the stratigraphy trends northward and southward from Goose Island and dips at steep angles, generally greater than about 55 to 60 degrees to the west. Axial planar and bedding-parallel foliation, which is pervasive throughout the rock mass, occurs commonly as healed fractures rather than open fractures within the rock. Axial plane bedding-parallel ductile shearing are common due to intense regional deformation events. This shearing is most commonly associated with weaker lithologic units, such as the ultramafic rock.

3.3 Vault Deposit Area (including Phaser and BB Phaser Pits)

The Vault Deposit area is underlain by a sequence of intermediate volcanic rock that has been altered by sericite, chlorite, and silica. The stratigraphy is consistently inclined south-southeast between approximately 20 and 30 degrees.

The pit area is generally underlain by permafrost, with the exceptions of the east pit wall where it is pushed back into the former Vault Lake, and sections of the north pit wall which also intersects an arm of Vault Lake. The Vault Pit footprint area included a smaller lake which was drained. Vault Lake and the smaller lake were underlain by talik (unfrozen ground) and water inflows can be expected where the pit wall intersects the talik. This has resulted in the formation of ice walls during winter on the east/southeast wall of Vault Pit.

The stratigraphy and foliation are the most significant structural characteristic at the Vault Deposit area. The foliation is continuous and closely spaced, whereas joint sets are generally discontinuous and terminate within the rock mass or at other intersecting joint sets.

3.4 Tectonic and Structural Features

3.4.1 Portage Pit

Historically, the main tectonic features within the Portage and Goose Pit areas are the Second Portage Lake Fault and the Bay Fault. More recent wall instability associated with the south wall of Pit E has been observed and appears to be related to shearing of the ultramafic rock exposed in this wall and subsequent folding of the weaker stratigraphy into adverse orientations relative to the wall.

The Second Portage Lake Fault is interpreted to trend northwest-southeast, parallel to the axis of Second Portage Lake, dipping at approximately 70 degrees to the southwest. The fault has been identified to intersect the east and west walls of the Portage Pit.

The Bay Fault trends south through the Portage Pit, and may be responsible for shearing of the ultramafic units at the south end of Pit E, and beneath the Pit E ramp. Intense polyphase deformation at the south end of Pit E has resulted in folding and re-folding of sheared ultramafic rock, leading to instability of the south wall.

3.4.2 Goose Pit

The Bay Fault extends south to intersect the Goose Pit, and is visible in the north and south walls of the pit. The fault trends south from the pit to intersect the Bay-Goose Dike approximately at Chainage 31+625 along the centreline. Water in-flows to the pit along the Bay Fault in the south wall have been noted during previous site visits.

A shallow west dipping sheared stratigraphic contact intersects the upper west wall of the Goose Pit, and was the source of significant water inflows to the pit during mining. The contact is inclined at a shallow angle between about 20 and 30 degrees to the west, striking in a north-south direction. The contact extends south from the pit, passing beneath the dewatering dike approximately at Chainage 31+925. Water was observed to flow along this contact, and the feature is likely hydraulically connected to Third Portage Lake. At the downstream toe of the dewatering dike, along the projection of the contact trace, seepage has previously been observed. In the pit area, the contact is intersected by east-west steeply to vertically dipping faults and joints which provide a mechanism for east-west flow of water behind the south and west pit walls and into the pit. During winter an ice curtain forms on the west wall.

3.4.3 Vault Pit

Faulting in the Vault area generally takes the form of moderate to high angle, east and south dipping discrete fault structures. In general, the east dipping faults are inclined at approximately 70 degrees, while the south dipping faults are inclined at approximately 55 degrees. These faults either will intersect the pit walls at high angles, or will dip into the pit walls. Potential wedges formed by the intersection of these through-going continuous features will plunge into the south and southeast pit wall at angles of about 50 degrees. Planar failures will be a factor for south and southwest facing walls where the south dipping faults intersect the wall. Major fault structures in the area are considered continuous, and may therefore influence pit slope stability at both an overall slope and bench scale. However, these faults are very widely spaced, about 30 m to 100 m based on previous surface mapping interpretation and as such the risk of a kinematically feasible planar failure is reduced.

3.5 Permafrost

The Meadowbank Mine project area is located within the Low Arctic ecoclimatic zone (Golder 2007). The topography of the surrounding area is of generally low relief with an elevation range of about 70 m. The ground ice in the region is estimated between 0% and 10% (dry permafrost) based on regional scale compilation data.

Continuous permafrost to depths between 450 m and 550 m underlies most of the Meadowbank project area. The depth of the active layer ranges from about 1.3 m in areas of shallow overburden, and up to 4 m adjacent to lakes (Golder 2007). Taliks are present beneath the lakes and water courses; small lakes will have closed taliks beneath them while larger lakes will have taliks extending through the permafrost to the underlying deep groundwater regime. The shallow groundwater flow regime has little to no hydraulic connection with the deep groundwater regime below the permafrost.

4.0 PORTAGE PITS A AND B INSPECTION

4.1 Pits A and B Overview

Mining of Pit A was active at the north end of the pit, with planned completion in 2017. Mining of Pit B is finished and it continues to be backfilled as a waste rock dump (Dump B). Access is by ramps on the east wall and from the south through Dump B.

The inspection consisted primarily of observations made from the crest areas, and from the base of the pit, comparing the current conditions with those previously observed.

A view of Pits A and B at the time of the site visit is shown in the following photographs. The bench height in the photographs is 21 m.

Photograph 4-1: Pits A and B looking west to north, from east crest (2017)

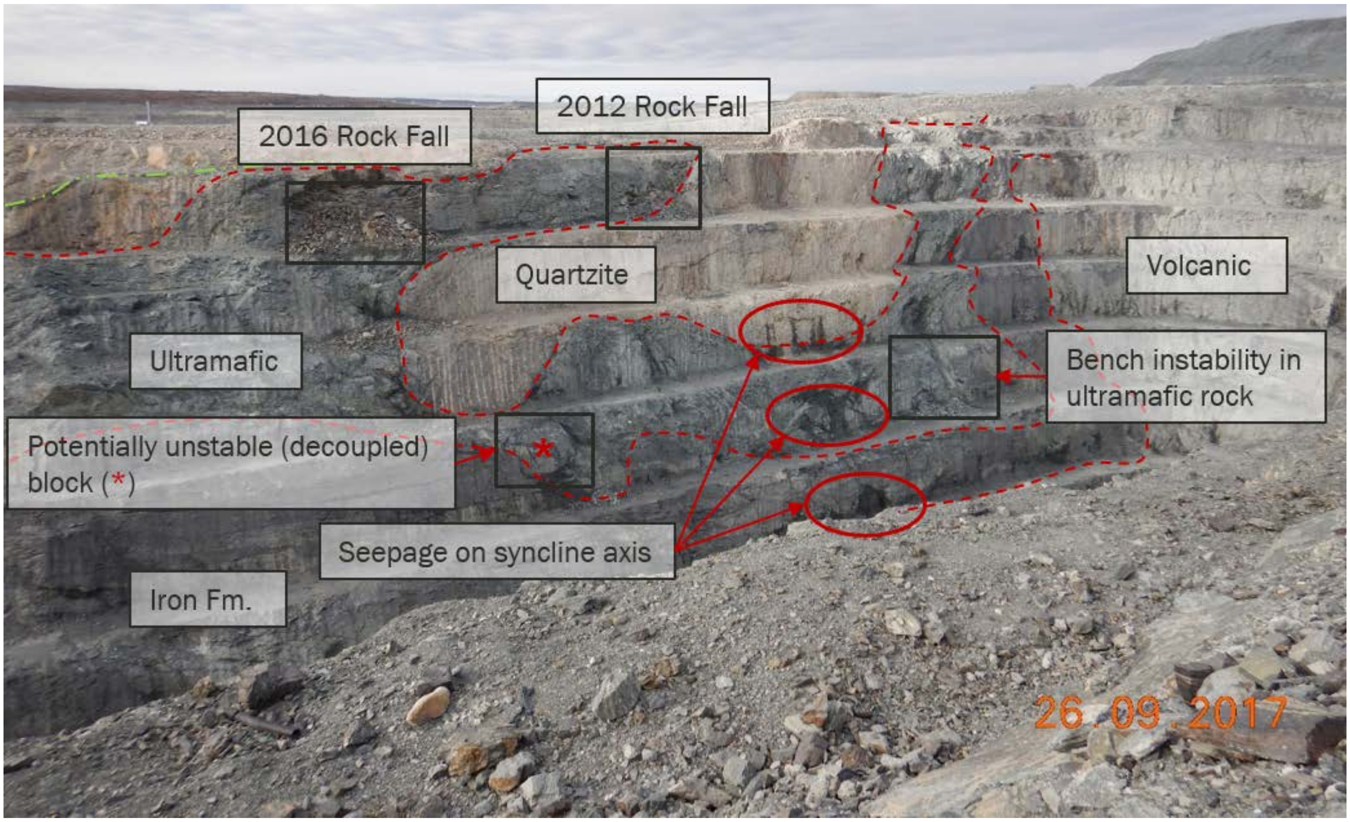
Photograph 4-2: Pits A and B looking north from west crest (2017)

4.2 Pit A Inspection

Pit A is at the north end of the Portage Pit, and includes the northwest through northeast end walls of the pit. At the time of the site visit mining was being carried out on the 5011 mRL platform with 1 bench remaining to be mined to the final floor elevation of 4997 mRL. Since the 2016 site inspection the west pit wall pushback in Pit A has been mined down. The floor area is relatively dry.

4.2.1 Pit A West Wall

The following Photograph 4-3 shows the west through north wall of Pit A at the time of the inspection.

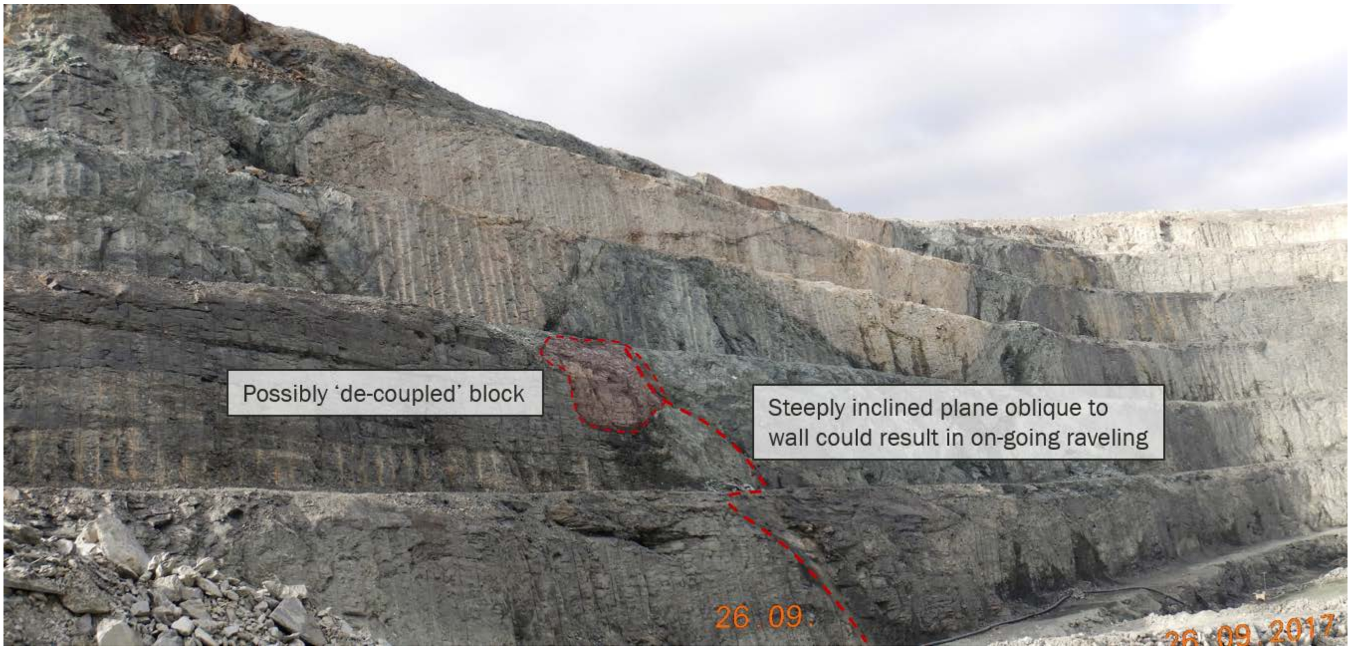


Photograph 4-3: Pit A west wall (2017)

The west wall of the pit continues to perform well in general, although local areas of instability identified during previous annual inspections continue to be monitored. No additional significant accumulation of material downslope of the 2012 and 2016 rock fall events is evident. While the September 2016 rock fall event spilled over two benches from 5109 to 5067, no subsequent failures have occurred in this area. As noted in other reports the 2012 and 2016 rock fall events were caused by poor quality ultramafic rock in combination with toppling failure along the steep fault zone.

Folding of the stratigraphy results in a synform structure in the west wall, along which seepage is noted. This is common as the synform can act as a 'trap' for groundwater. The uppermost seep is a possible indication of the local groundwater level behind this area of the wall. In general the wall is relatively dry, which reflects the permafrost conditions in the area, as well as possible drainage of the wall over time.

Since the 2016 inspection, benching down of the west wall has been generally within the iron formation, and the lower benches are performing well as shown in Photograph 4-4 below. A steeply inclined, undulating plane which strikes obliquely into the wall was noted, and this may be a source of on-going raveling of material, although currently the bench face is performing well. A possibly de-coupled rock block is also visible, as shown in the photograph, and this should be monitored.



Photograph 4-4: Pit A lower west wall bench performance in iron formation

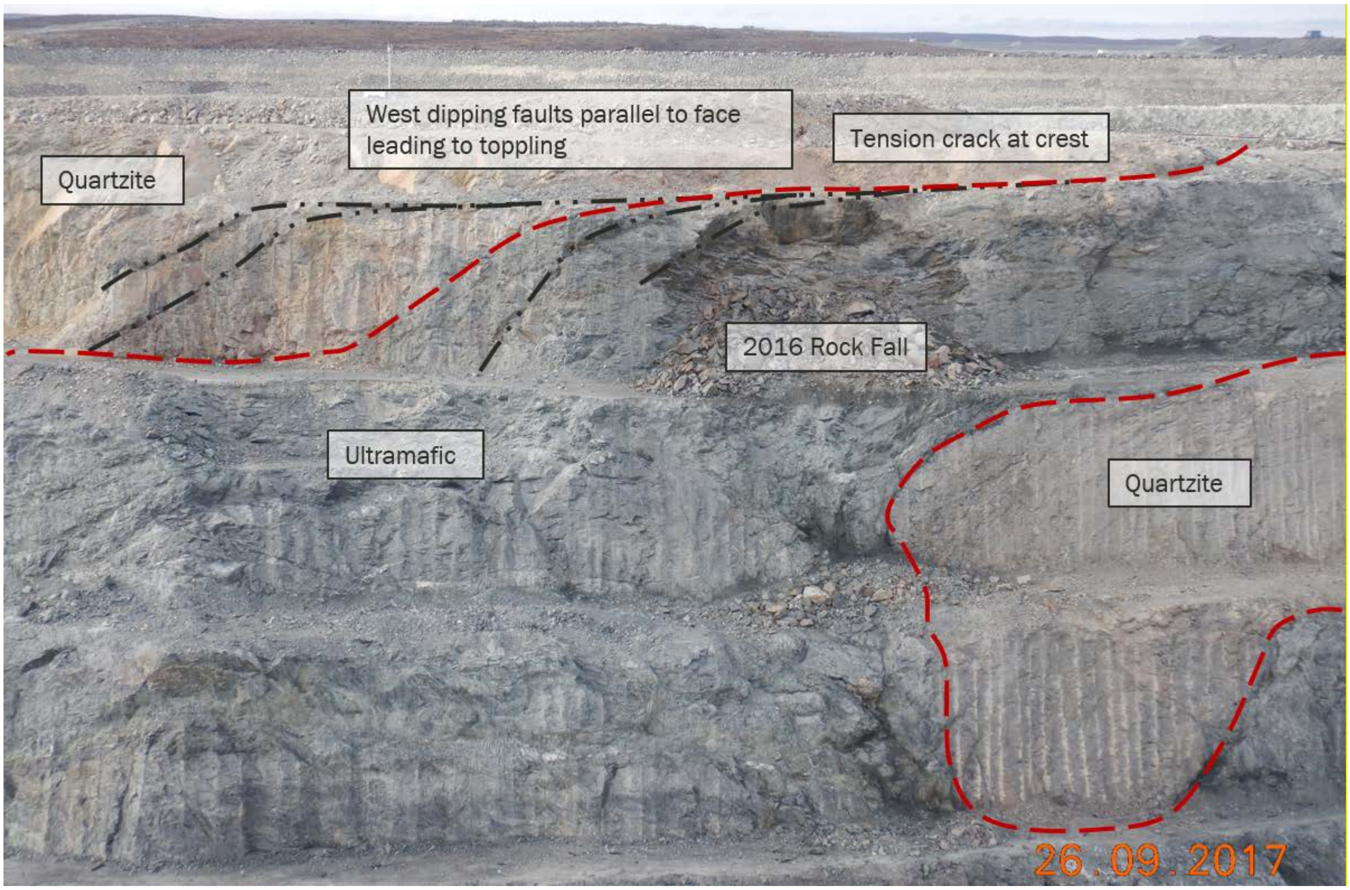
The following actions are recommended:

- Continue visual monitoring and recording observations as part of regular site geotechnical inspections.
- Specifically monitor the de-coupled rock block and steeply inclined plane below the 5046 bench for additional raveling or signs of instability.

4.2.1.1 5109 Bench Instability and September 2016 Rock Fall Event

Areas of rock fall events occurring in 2012 and 2016 on the 5109 bench continue to be monitored. As described above, no significant increase in accumulation of material on the benches below these areas was noted during the 2017 site inspection.

Contributing to these rock fall events is a series of parallel fault features that trend behind the uppermost bench, dipping at around 60 degrees, and approximately parallel to the contact between the ultramafic and quartzite rock. These features were identified during the 2011 inspection along which potential toppling could develop, which is what occurred during the 2012 and 2016 rock fall events. The rock type in the footwall of these features is ultramafic, serpentinized, strongly sheared, and consequently poor quality.



Photograph 4-5: Pit A West Wall 2016 rock fall and tension cracks

A tension crack is located at the crest of the bench and associated with the faults behind the wall. The location is shown on Photograph 4-6.

Photograph 4-6: Bench above 2016 rock fall showing tension crack

During 2017 AEM used an independent specialist contractor (Vertika) attempted to force failure of this rock block using air bags in the tension crack. Despite several attempts the rock was not loosened at all despite reportedly applying up to 30 T of pressure (Vertika 2017).

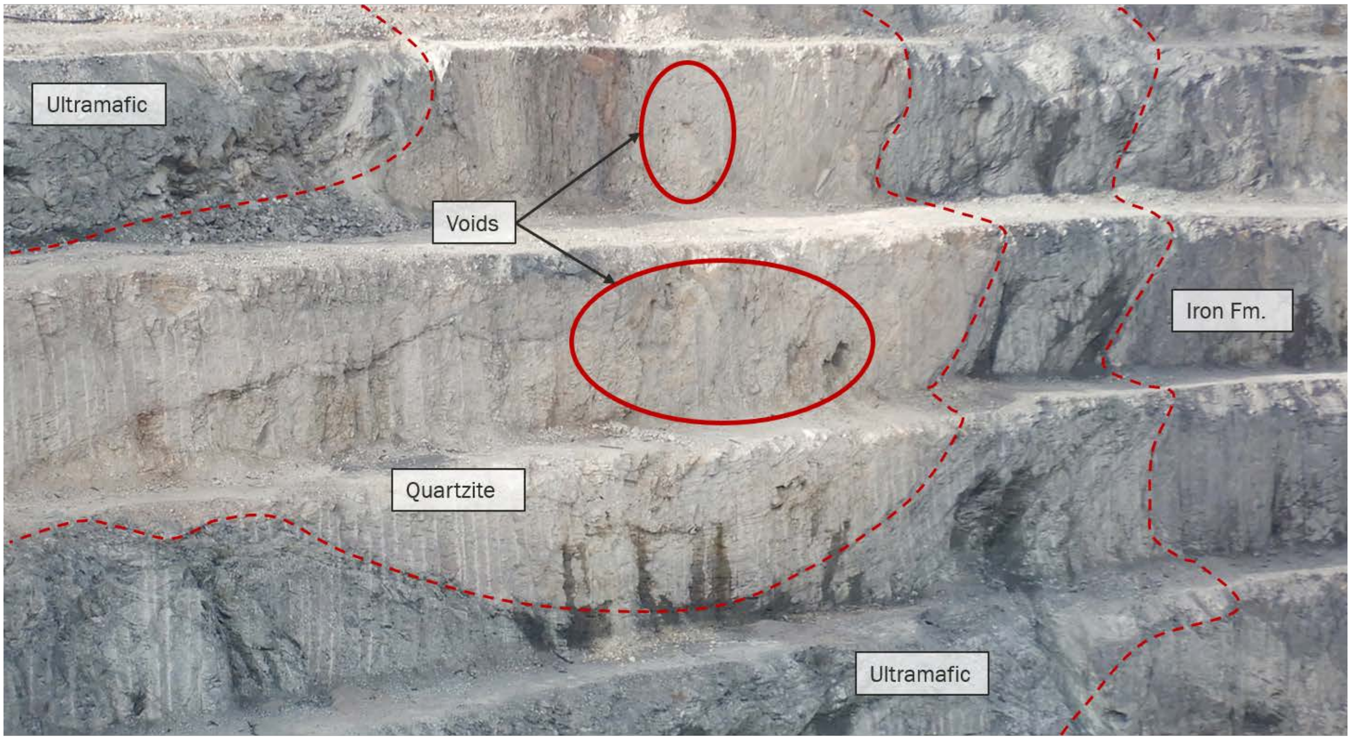
The following actions are recommended until mining is finished at Pit A:

- Mark the tension crack location on a geohazard plan.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections, and especially during high rainfall events or at freshet.

- Minimize exposure time at the toe of the slope.
- Maintain a safe working distance in accordance with the internal AEM safe work procedure for work close to pit walls.
- Incorporate information on rock fall risk into safety inductions and tool box talks.

4.2.2 Pit A West Wall Voids

The quartzite stratigraphy observed in the Pit A west wall contains several large voids identified during previous inspections. There has been no significant accumulation of material on the benches since the 2016 inspection.



Photograph 4-7: Voids in quartzite above Pit A west ramp (2017)

There are currently no geotechnical concerns associated with the voids.

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

4.2.3 Pit A North to Northeast Wall

The north through northeast walls of Pit A continue to perform adequately. Very little accumulation of loose or raveling material on the catch benches was noted during the site visit.

Photograph 4-8: Pit A north to northeast wall (2017)

The following actions are recommended:

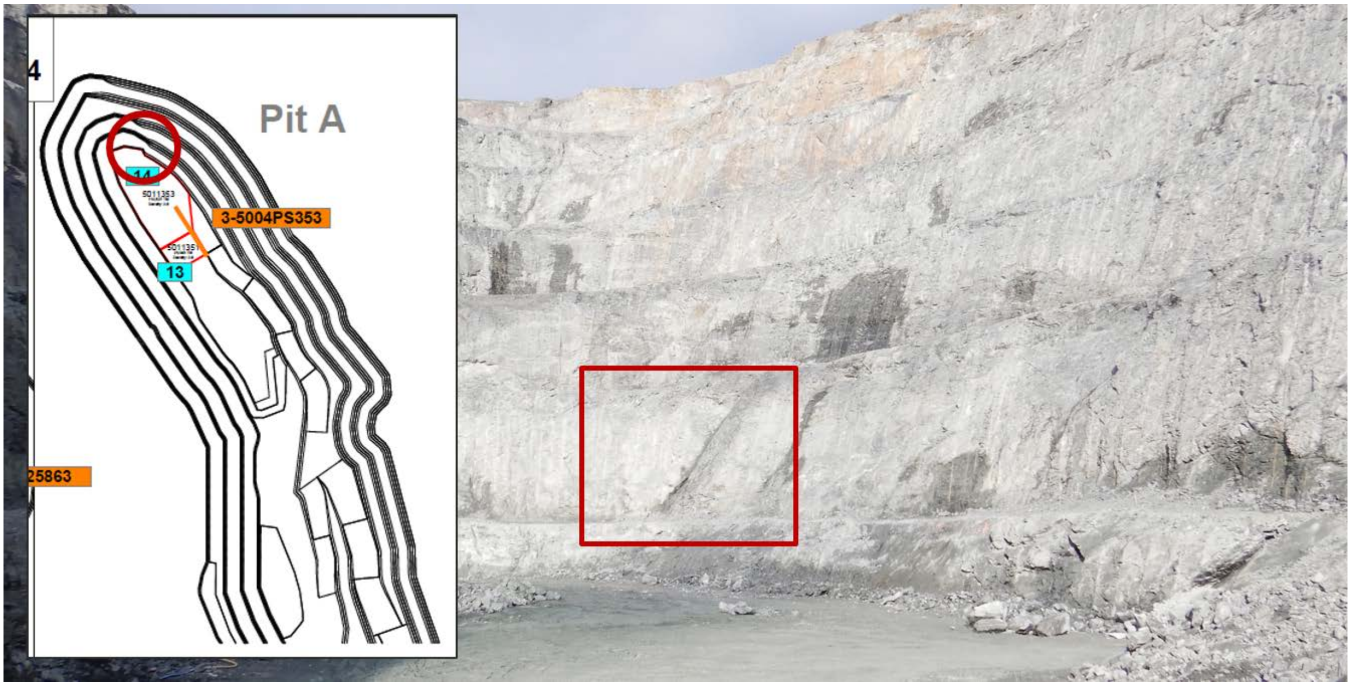
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

4.2.4 Pit A East Wall

The upper benches of the Pit A East Wall continue to perform satisfactorily, as shown in Photograph 4-9.

Photograph 4-9: Pit A east wall upper benches (2017)

A wedge failure was reported on 17 June 2017 at the base of the pit slope, near the transition from the northeast to east wall as shown in Photograph 4-10



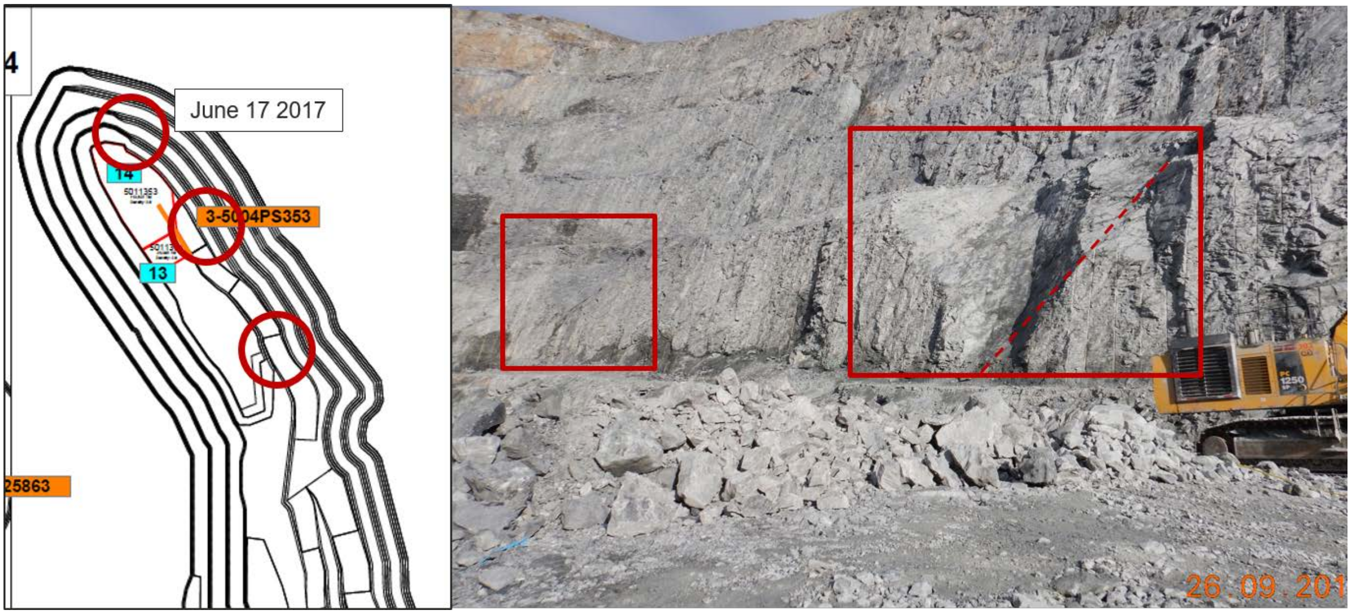
Photograph 4-10: PIt A east wall, June 17 2017 wedge

The wedge is formed by the intersection of west dipping foliation and a north dipping cross joint set. The wedge mass was estimated by AEM to be 179 tonnes, and the event was reported to the Mines Inspector and recorded in the on-site rock fall log.

Table 4-1: Pit A 2017 rock fall events

Date of Rock fall	Location	Rock type	Estimated or calculated tonnage	Predicted by radar	Comment
6/17/2017	North east	Intermediate Volcanic	179	N/A	

Additional bench scale wedges were encountered while mining the lowermost bench, comprised of similar structure. These were scaled out as the bench was mined down. As there is the potential for additional wedges to form in this lower bench, access to the area should be limited and operators should be aware of potential wedge instability. This area should be included with regular geotechnical monitoring.



Photograph 4-11: Pit A east wall, north end additional wedges (2017)

The following actions are recommended:

- Control access along the lower benches until mining is completed.
- Make operators aware of the risk for wedge instability.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

4.2.5 Portage Pit B Inspection (B Dump)

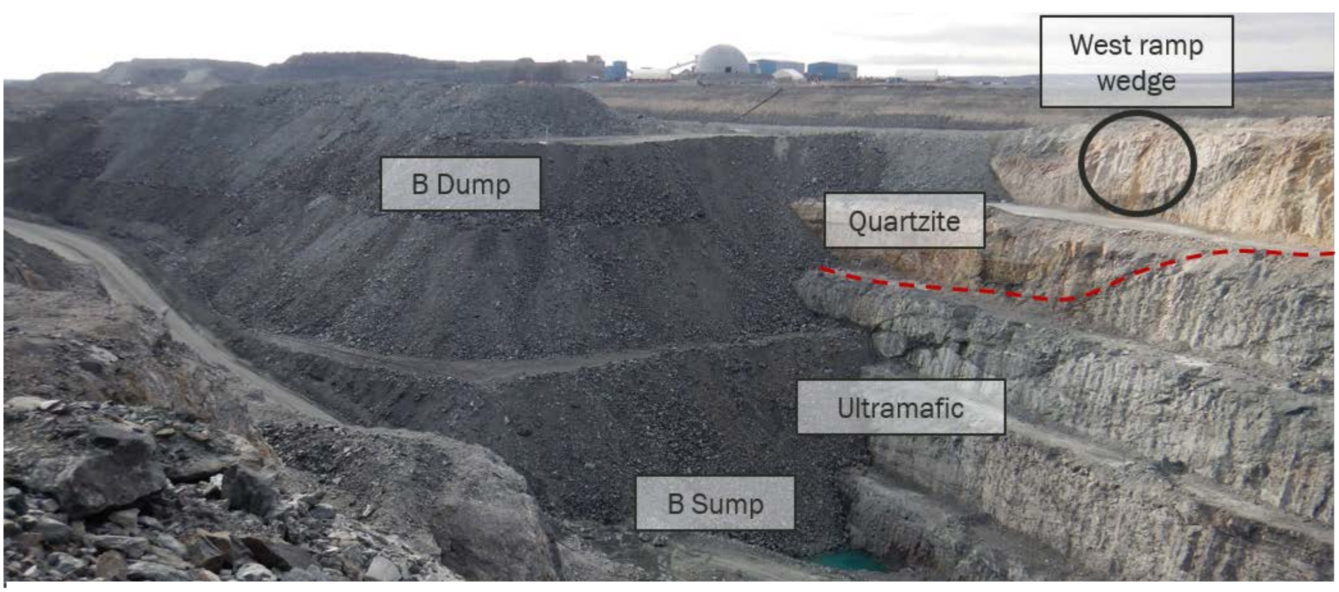
Pit B extends south from Pit A. Mining of Pit B is complete, and it is being backfilled as a waste rock dump. There have been no changes to the platform elevations of the Pit B and Pit C dumps since the 2015 site visit.

Photograph 4-12: Looking south at Pit B dump in foreground and Pit C dump in background (2017)

4.2.6 Pit B West Wall

The remaining portion of west wall of Pit B that has not been backfilled with waste rock continues to perform adequately. Quartzite is exposed in the upper benches overlying ultramafic rock, and iron formation. There is no access to the west wall of the pit, and access to the base of the pit is gained by the east ramp which also provides access to Pit A. The sump at the toe of B Dump has been drawn down several metres since the 2016 inspection.

The general performance of the west pit wall is shown in the following photograph.



Photograph 4-13: Pit B west wall performance (2017)

There is no evidence of large-scale instability for the west wall of Pit B.

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

4.2.7 Pit B West Ramp Wedge

The west wall of Pit B is no longer accessible, and ramp access to the pit is by the east wall and from the south from Pit B Dump. The west ramp wedge identified during the 2014 inspection presents only a minor risk in terms of bench scale failure as there is no longer any traffic below this feature. If traffic is permitted in this area again, an additional risk assessment should be undertaken.

4.2.8 Pit B East Wall

The east wall of Pit B was inspected from several viewpoints as well as from within the pit. The wall continues to perform satisfactorily. Benches are generally clean with little accumulation of material.

Photograph 4-14: Pit B east wall, looking south (2017)

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

4.2.9 Pit B Dump

The crest elevation of the Pit B dump has not changed since the 2016 site visit, and was at 5126.5 mRL. The planned final crest elevation will be 5145 mRL. The dump is being constructed as a dump and doze operation. The following photographs show the performance of the dump platform and dump face.

Photograph 4-15: PIt B dump platform (2017)

Photograph 4-16: PIt B dump looking southwest (2017)

The crest of the dump was traversed, and no evidence of tension cracks or settlement were observed: furthermore, no bulging of the dump toe or dump face was observed.

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

5.0 PORTAGE PITS C AND D INSPECTION

Pits C and D extend south from Pit B to form the central dump of the Portage Pit. Mining is complete at both pits and they continue to be backfilled as waste rock dumps. At the time of the site visit the Pit C main platform elevation remained the same as for the 2016 inspection, at 5145 mRL, with a planned final elevation of 5129 mRL at closure. The Pit D main platform elevation also remained at 5127 mRL, with a planned final platform elevation of 5129 mRL.

5.1 Pit C Dump

A photograph looking south at the waste rock dump in Pit C is shown below.

The west and east pit walls of Pit C are buttressed by waste rock and no longer present any geotechnical hazard.

The main dump platform for Pit C is used for storing stockpiles of stemming material. The Pit C dump platform was visited only briefly and was noted to be performing satisfactorily.

Photograph 5-1: Pit C waste rock dumps looking south (2017)

5.2 Pit D Dump

The Pit D dump continues to be active, and extends across the Pit E floor. This is shown in Photograph 5-2 which also shows active dumping from the crest area

Photograph 5-2: Pit D dump, viewing northeast from crest of Pit E (2017)

An area along the eastern edge of the lower dump platform visited during the 2016 site inspection was noted to have tension cracks formed at the crest. This area was visited again in 2017. Tension cracks are still present in the crest area but have do not appear to have not developed further. The tension cracks are at the eastern edge of the dump platform where it abuts the east wall of Pit E. It is possible that the tension cracks are the result of some differential settlement between the dump material, and the dump material that is overlying the rock benches of the former pit wall. These are not considered indicative of overall instability; no other indicators of large slope instability such as bulging of the dump face were noted.

Photograph 5-3: D dump tension cracks at eastern margin of lower dump (2017)

The upper platform was also visited during the site visit, in the area of active dumping. While some sag in the platform near the crest was noted due to loading by the haul trucks, no tension cracks were noted.

The following actions are recommended:

- Continue visual monitoring of waste rock dumps and recording of observations as part of regular site geotechnical inspections.

6.0 PORTAGE PIT E INSPECTION

The Pit E5 pushback on the 5088 mRL platform of the south wall of Pit E is the current active mining area in Pit E. A ramp (the South Ramp) enters the Portage Pit E area from the crest on the west side of the pit. The ramp is currently closed, but is planned to be reactivated in 2019. No mining activity is being carried out in the base of the pit below the pushback area. A pit lake covers the Pit E floor with an elevation of approximately 5018 mRL.

Photograph 6-1: Pit E viewing north (2017)

The final floor elevation is projected to be 4976 mRL. The target completion of mining of Pit E is Q3 2019.

The Pit E east wall continues to perform well. Much of the wall was developed in permafrost beneath the former Third Portage Peninsula, and remains frozen. There are no on-going stability issues of significance with the east wall.

The west wall has localized bench-scale instability associated with the weaker ultramafic rock exposed at the base of the wall, and adverse structure (shearing in the ultramafic rock) inclined into the walls and resulting in overhangs.

The Pit E south wall experienced multi-bench failures of the ultramafic rock in September 2015. The wall is currently being mined as a pushback of the existing wall into more favourable structural and rock mass conditions for overall slope stability. Recommended slope monitoring instrumentation has been installed and a ground control management plan has been developed.

Photograph 6-2: Pit E viewing south (2017)

Several bench scale instabilities have occurred during mining of the push-back as a result of undercutting of local structures. These have typically been identified during geotechnical inspections and are being managed accordingly by scaling, and through the use of berms and candles to limit access in these areas.

6.1 Pit E East Wall

The Pit E east wall is excavated in good quality intermediate volcanic rock. The main structural control for the east wall is the steeply west dipping stratigraphy and sub-parallel foliation. Bench face angles have been excavated generally parallel to the dominant structural orientation, and the bench and overall wall performance continues to be satisfactory. Final benches have been cleaned and scaled appropriately. There is no noticeable accumulation of additional debris on the benches or deterioration in wall performance since the 2016 inspection.

Photograph 6-3: Pit E east wall performance (2017)

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

6.2 Pit E South Wall

Pit E south wall exposes primarily ultramafic rock, with iron formation and volcanic rock on its eastern edge. The ultramafic rock is poor quality. From approximately June to September of 2015 several single and multi-bench failures within the ultramafic rock exposed in the south wall occurred. The ultramafic rock to the east and west of the failure area is in permafrost, is absent of groundwater, and is performing adequately. Additional stability analyses were carried out in 2016 to evaluate the stability of the south wall. The stability analyses concluded that there is a ‘core’ of potentially unstable ground through the middle of the south wall associated with increased structural complexity including folding, faulting, and hydraulic connection to the Third Portage Lake. Following the assessment AEM evaluated other options for mining of the ore, which resulted in a wall redesign to push the wall back into more favourable ground conditions and structure. The Pit E5 pushback expansion area is shown in Figure 6-1 below.

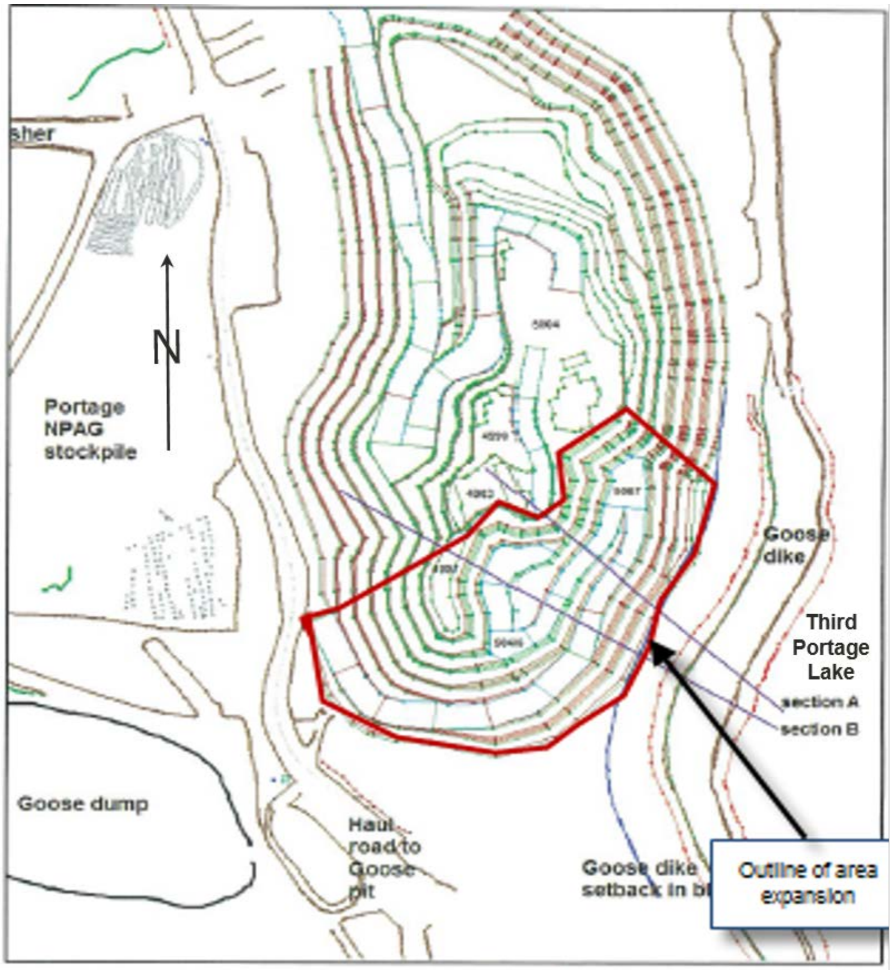


Figure 6-1: Pit E5 pushback expansion area

A geotechnical drilling investigation was undertaken in 2016 to collect additional geotechnical and hydrogeological information in the proposed pushback area. The data were used to confirm the geological model for the proposed pushback specifically in critical areas adjacent to the Bay Goose dewatering dike. An updated limit equilibrium stability assessment was carried out to evaluate the overall slope stability and haul road stability for the proposed pushback (Tetra Tech 2017). The work included stress/deformation modeling of the slope and of the dike base. The limit equilibrium modeling indicated the overall slope to be stable, but that local instability at the bench scale could occur where foliation is outward dipping and undercut by local bench face angles. A finite element model was used to investigate possible displacements across the base of the Bay Goose dewatering dike and the cut-off wall. The displacements were predicted to be small and not expected to affect the integrity of the dewatering dike cut-off wall or the stability of the dike structure. A shear strength reduction analysis of the rock slope returned a strength reduction factor of 1.8, similar in magnitude to the factor of safety determined by limit equilibrium methods.

The study recommended the installation of specific instrumentation behind the wall to monitor the slope stability as the wall is pushed back and mined down. With the exception of prisms, the recommended instrumentation was installed, and includes time domain reflectometry (TDR) cables, thermistor and vibrating wire piezometers, and a slope inclinometer. These data have been reviewed as part of this site inspection, and are summarized later in this document.

The following photograph shows the south wall at the time of the site visit. The wall has been mined down from the 5109 mRL platform in 2016, to approximately the 5088 mRL platform.

Photograph 6-4: Pit E south wall (2017)

6.2.1 Pit E Rock Fall Events

During the site visit, the ramp and platform areas were visited. Several planar type rock fall failures associated with release along the steeply dipping foliation planes occurred in June 2017, and one in July 2017. All rock falls were recorded in the rock fall log, and reported to the Mines Inspector. The following table summarizes the events.

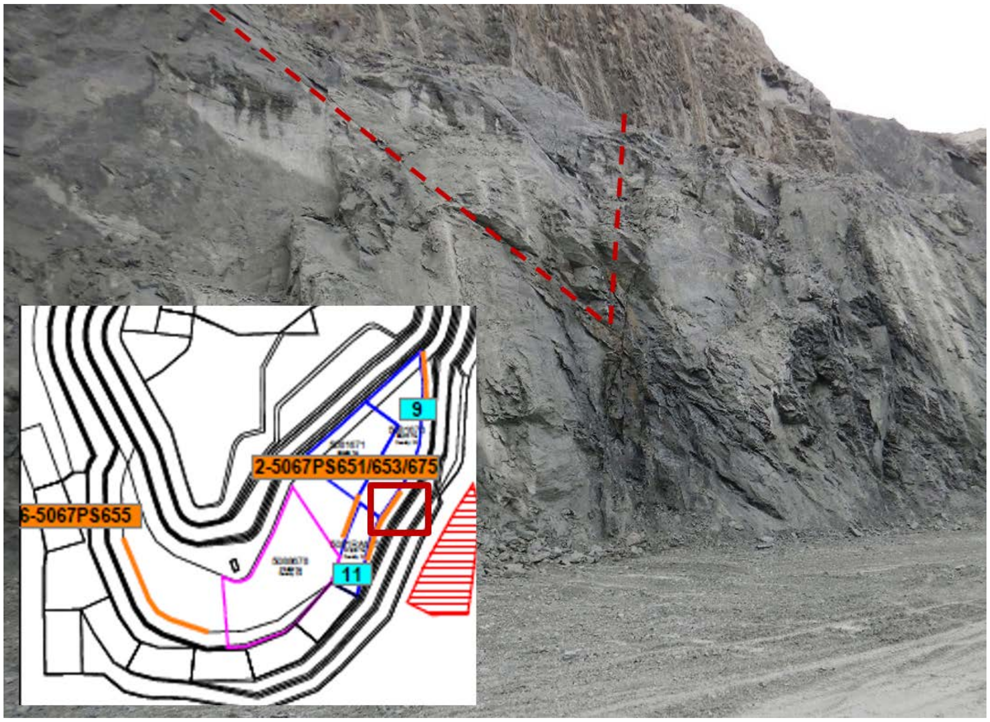
Table 6-1: Rock fall events in Pit E during 2017

Date of Rock fall	Location	Rock type	Estimated or calculated tonnage	Predicted by radar	Comment
6/16/2017	South Wall	Intermediate Volcanic	350	Not monitored	
6/17/2017	South Wall	Ultramafic	300	No	
6/19/2017	South East wall	Ultramafic	337	Yes	
6/19/2017	South East wall	Ultramafic	172	Yes	
7/17/2017	South East wall	Ultramafic	60	no	New material observed on catch bench. Fell between July 15th and 17th.

Reference: Agnico Eagle Rock Fall Log 2017

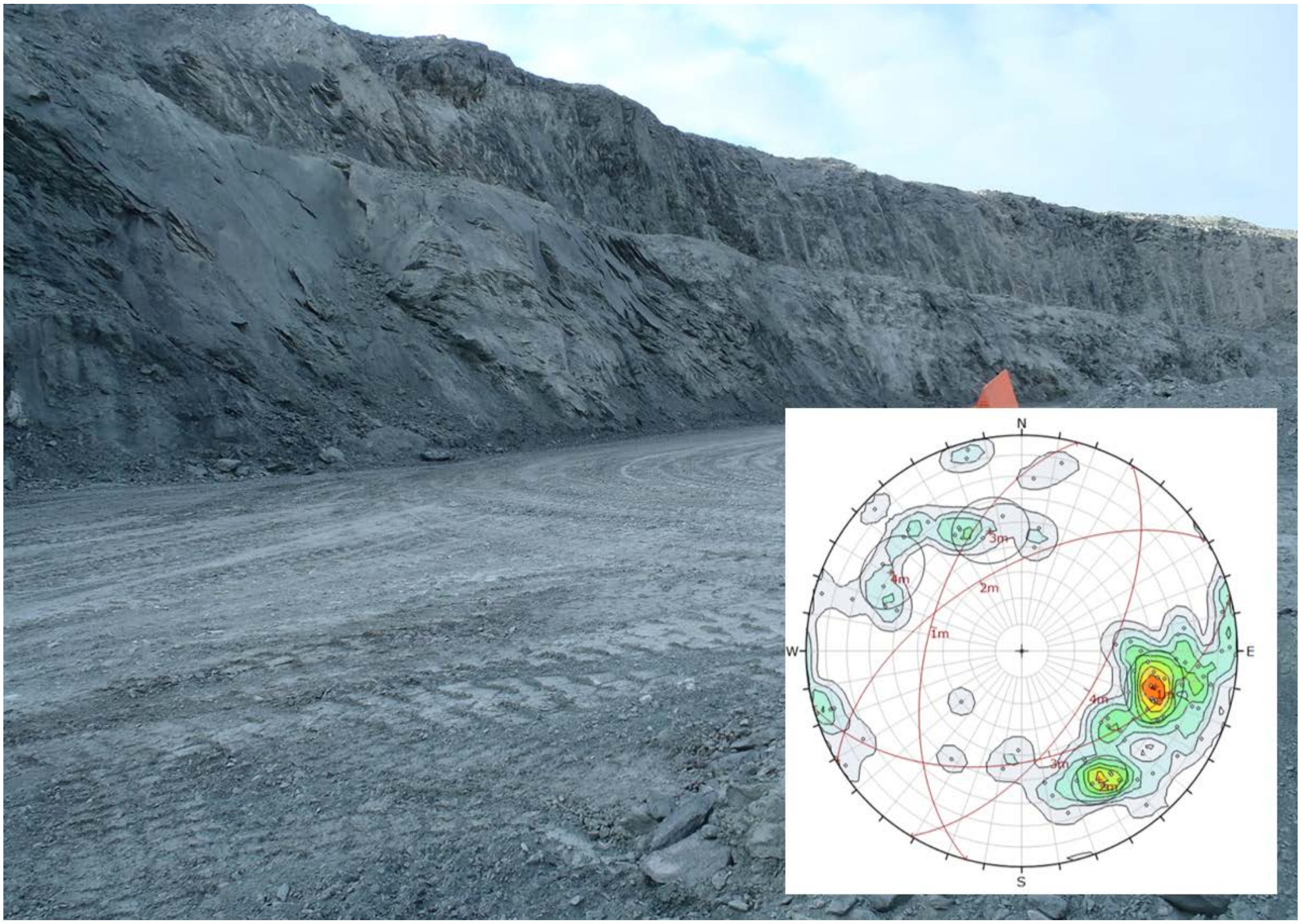
The dominant failure mechanism resulting in the rock fall events is generally planar failure along outward dipping foliation surfaces or a combination of planar and wedge mechanisms. Two of the failures noted in the above table were predicted by radar monitoring. AEM manage local bench scale instability adjacent to working areas and high-traffic areas by regular geotechnical inspections, appropriate scaling of instabilities when noted, and access restrictions in areas when required.

A bench scale wedge was noted along the south ramp access, shown in the following photograph. This was discussed with AEM during the site visit, and a bumper berm was constructed below the wedge to control access in the area.



Photograph 6-5: Pit E wedge above south ramp

AEM have adopted a recommendation from the Tetra Tech (2017) study to carry out mapping of the general rock structure to compare with the anticipated conditions based on geotechnical drilling. The following Photograph 6-6 shows a stereonet of the mapping data, combined with a photograph of the ramp south wall showing the planar foliation structure.



Photograph 6-6: Pit E5 ramp mapping data (2017)

The LiDAR data are consistent with the general engineering geological model for the south wall of the pit, and show the variability in the orientation of the foliation from west dipping to north dipping. Bench faces will consistently break to this ubiquitous and continuous structural fabric. Where intersecting features are encountered, wedge failure mechanisms can form.

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.
- Continue collecting and interpreting LiDAR data to confirm the orientations used in the development of the engineering geological model for the pushback area.
- Maintain bumper berms below wedges and planar failure mechanisms where identified, or scale potential failures and bench faces accordingly.

- Continue to monitor with radar.

6.2.2 Pit E5 South Ramp Wedge

During the site visit an area at the entry point of the haul ramp to the south end of the pit was noted to have significant raveling of material resulting in the accumulation of material on the bench below. This is shown in the following Photograph 6-7. This was discussed with AEM during the site visit, as on-going raveling could result in undercutting of the ramp access. It was recommended that this area (south ramp wedge) be included in the regular geotechnical inspections, and specifically to inspect for the formation of tension cracks along the outside edge of the ramp. In addition, this area should be included in monitoring by the radar system.

Photograph 6-7: Raveling of material below south ramp entry (south ramp wedge)

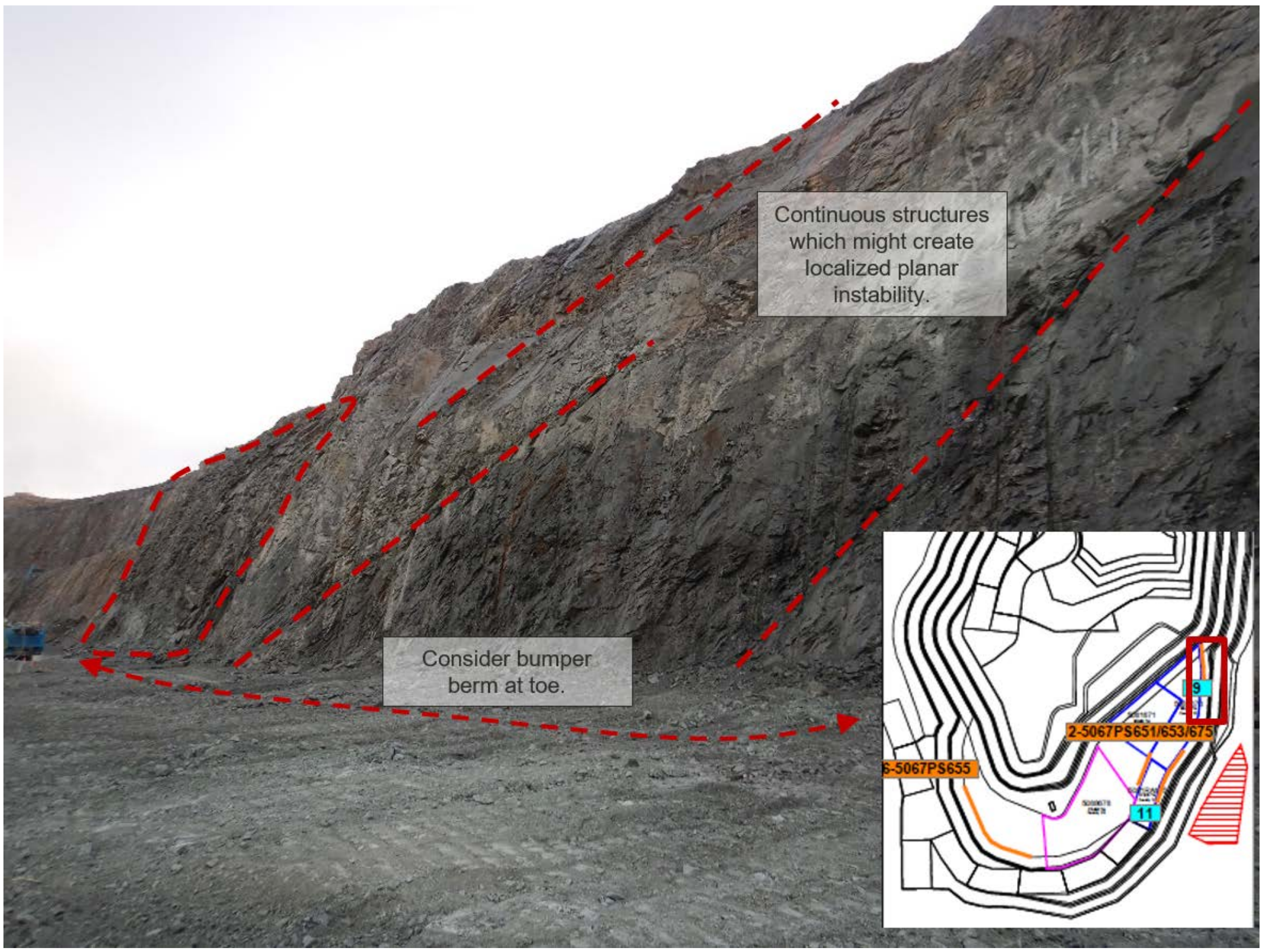
It was noted that if instability in the ramp is noted, there is sufficient area along the inside edge of the ramp that the ramp wall could conceivably be pushed back in this area to accommodate such instability if necessary.

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.
- Inspect outside edge of ramp for tension crack formation.
- Monitor with radar.

6.2.3 Pit E Southeast Wall Planes

Several outward dipping planes were noted above the switchback of the ramp. Some of these were scaled out during development of the ramp. The observed planes are oblique to the wall orientation, and do not directly daylight in the bench face. Nevertheless there is some potential for planar instability in this area. Given that the ramp switchback is directly below this area, it should be included as part of regular geotechnical inspections to identify if any instability is developing. This area was not covered by the GroundProbe radar alarm mask, and it was recommended to set the alarm mask to cover this area during monitoring. Safe set back distances from this area of the wall should be established, and a bumper berm restricting entry beneath the wall should be considered.



Photograph 6-8: Planar structure above south wall ramp switchback

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.
- Include in radar monitoring of south wall.
- If possible without restricting traffic flow on the ramp, install bumper berms to control potential rock falls.
- Light vehicles should not be permitted to park beneath wall.

- Establish safe setback distance.

6.2.4 General Observations

One hard toe was noted during the inspection along the ramp. AEM identify these during the regular geotechnical inspections on site, and communicate to operators for removal. During the site visit AEM indicated they were aware of this but the equipment required to hammer out was currently under repair.

Photograph 6-9: Pit E hard toe remaining on south wall access ramp

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.
- Inform operations on the location of any hard toes, and remove.

6.2.5 Pit E5 Instrumentation

The instrumentation data are contained in Appendix A and some observations are summarized below.

A recommendation from the Tetra Tech analysis report for the wall pushback (Tetra Tech 2017) was to install specific instrumentation in and behind the pushback area for slope monitoring purposes while the area was mined. AEM have installed instrumentation which is generally consistent with the recommendations by Tetra Tech, with the exception of prisms for monitoring surface movement. Since the GroundProbe radar is constantly monitoring the wall for movement, the current instrumentation installed is considered to be adequate in the absence of prism data. The instrumentation consists of vibrating wire piezometers, time-domain reflectometry (TDR) cables, thermistors, and an In Place (IP) inclinometer.

The following photograph shows approximately where the instrumentation has been installed.

Photograph 6-10: Pit E south wall instrumentation locations

The following table summarizes the instrumentation installed in 2017.

Table 6-2: Pit E5 list of instrumentation

Borehole	Inclination	Comments	Vibrating Wire Piezometer depth (in hole)	Thermistor	TDR Cable
E4-01 (E5-17-01)	-60	From pit crest, toward pit, sub-parallel to wall dip	150m/75m/37.5m	No	Yes
E4-02 (E5-17-02)	-90	From in-field between crest and dike, vertical.	100m/32.5m	Yes	Yes
E4-03 (E5-17-03)	-60	From pit crest, toward pit, sub-parallel to wall dip	150m/75m/37.5m	Yes	Yes
E4-04 (E5-17-04)	-90	From in-field between crest and dike, vertical.	100m/32.5m	No	Yes
E4-05 (E5-17-05)	-60	From pit crest, toward pit, sub-parallel to wall dip	150m/75m/37.5m	No	Yes
Inclinometer (E5-17-06)	-90	Vertical	No	No	No
Surface Prisms	N/A	N/A	N/A	N/A	No

6.2.5.1 TDR Cables

Five TDR cables were installed in boreholes drilled behind the south wall of the Pit E in 2017 to monitor slope movement. A review of the data indicates no slope displacement. It was noted at the time of the site visit that the TDR monitoring system was not connected to the site Automated Data Acquisition System (ADAS), as the software module required to do so had not been purchased. The requisition for the module had been approved and Tetra Tech understands the TDR cables are now accessible through the GeoExplorer interface.

6.2.5.2 Thermistors

Two thermistors were installed in 2017, in PE5-17-02 (vertical) and PE5-17-03 (inclined). The objective of the installations was to confirm the assumptions of the permafrost and ground thermal regime in this area of the wall, which have suggested this area to be talik as it was submerged beneath Third Portage Lake prior to dike construction and draining of the lake.

The data indicate generally steady-state conditions have been reached, but only half a year of data have been collected and so the full thermal profile above the depth of zero annual amplitude is not yet known.

The data from 17-02 indicate frozen ground conditions from 5125 mRL down to approximately 5108 mRL. Below this depth the ground is not frozen, with temperatures reaching almost 2.5 degrees C. The data from 17-03 also indicate negative ground temperatures to approximately 5119 mRL, after which ground temperatures increase to between 1 and 2 degrees C. The data are consistent with the permafrost and hydrogeological conceptual models that this area of the wall is not frozen.

An interesting result noted in 17-03 is a decrease in temperature beginning around 5180 mRL, and becoming negative again around 5145 mRL. Following this temperature increases and becomes positive again. While it is possible this could be the result of a malfunctioning thermistor bead, this is thought to be unlikely as 3 of the preceding beads on the thermistor string support the overall trend. A detailed assessment of the significance of this is beyond the current scope of work.

6.2.5.3 Piezometers

Nested piezometers were installed in PE5-17-01 (3 VW), 17-02 (2 VW), 17-03 (3 VW), 17-04 (2V VW), and 17-05 (3 VW). Thermistors with the piezometer tips indicate that instruments 17-01 to 17-03 are within unfrozen ground, and 17-04 has one piezometer installed in unfrozen ground and one piezometer in frozen ground. Instrument 17-05 shows all piezometers installed at negative ground temperatures. The piezometers installed in 17-01 through 17-04 appear to be functioning properly, while it is uncertain for the piezometers in 17-05, which is located near the edge of the former Third Portage Peninsula which is known to be underlain by permafrost. It is possible that at temperatures only marginally below 0 degrees C the piezometers will still function, as a result of freezing point depression due to salinity of the groundwater.

During the review of the piezometer data an unusual response was first noted in 17-03B. A sudden drop in pressure head (almost 50 m) occurred around the July 28 2017, followed by a relatively rapid recovery to pre-drilling conditions by August 17 2017. A brief and limited review of blast records indicated that a blast pattern at the toe of the south wall slope was drilled from July 26 to July 29. A review of the records showed that the holes began dry, but were drilled wet from July 27 to July 29. This corresponds to the rapid (almost instantaneous) drop in pressure noted. The pattern blast was on August 29. AEM have noted that the spatial relationship between the blast pattern drilling and the location of the piezometer E5-17-03A is an important consideration for evaluating the response. Piezometer E5-17-03A was installed at the end of the inclined hole, and consequently is located vertically beneath the blast pattern. The remaining piezometers within PE-17, located higher in the hole, did not have the same response.

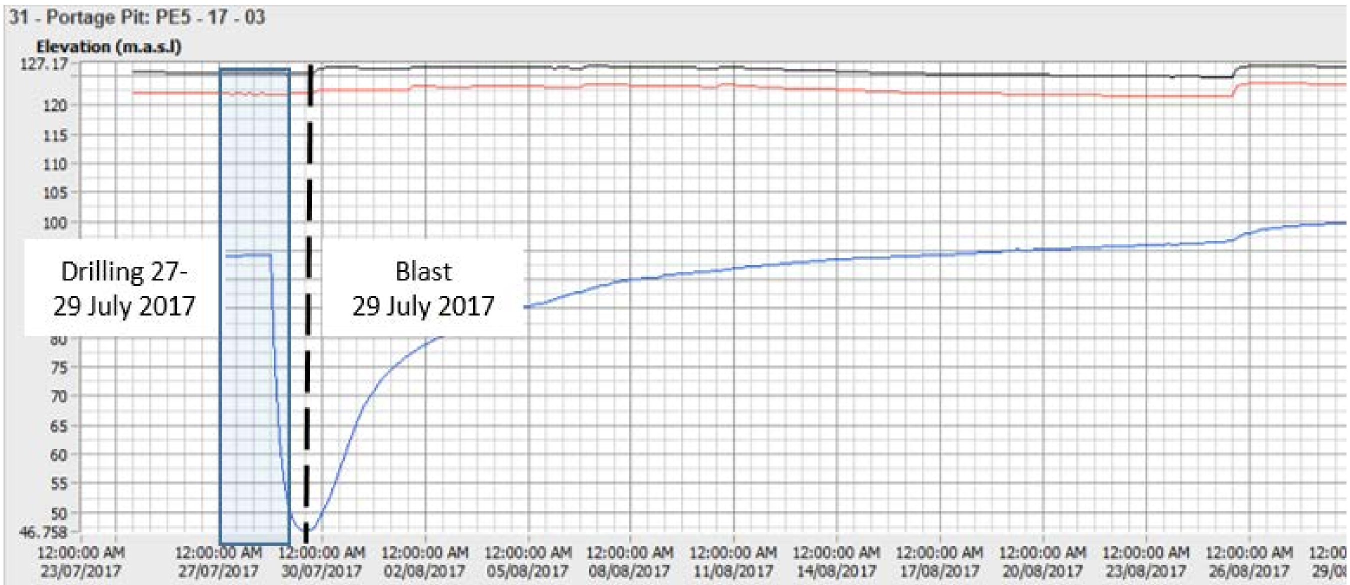


Figure 6-2: Instrument PE-17-03 piezometer response to drilling

A review of the other instrument records do not show the response to drilling, but do show a response to the blast. The responses to the blast are very similar for piezometers in 17-02 and 17-04, as well as from an existing installation P3E-14. The response involved a 1 to 2 metre rapid (almost instantaneous) rise in pressure head. This was followed by a series of perturbations over a period of 3 to 4 weeks at which time the pre-blast levels were reached. A similar response occurred around 25 August 2017 but was not investigated further.

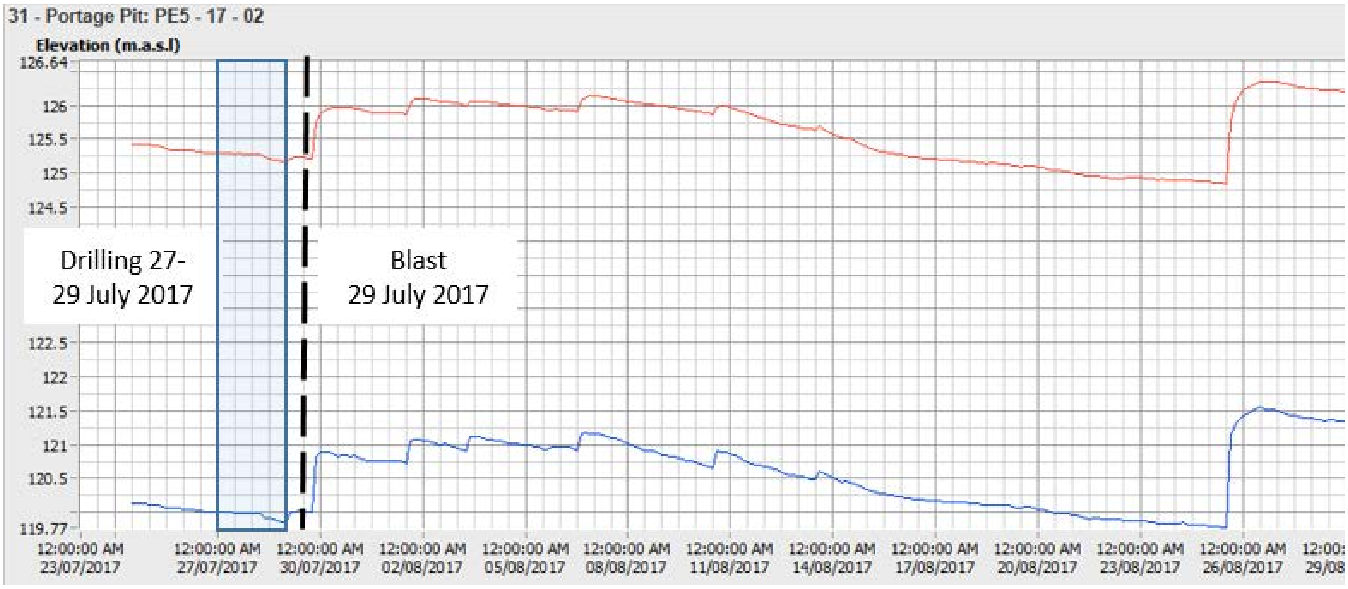


Figure 6-3: Instrument PE-17-02 piezometer response to blast

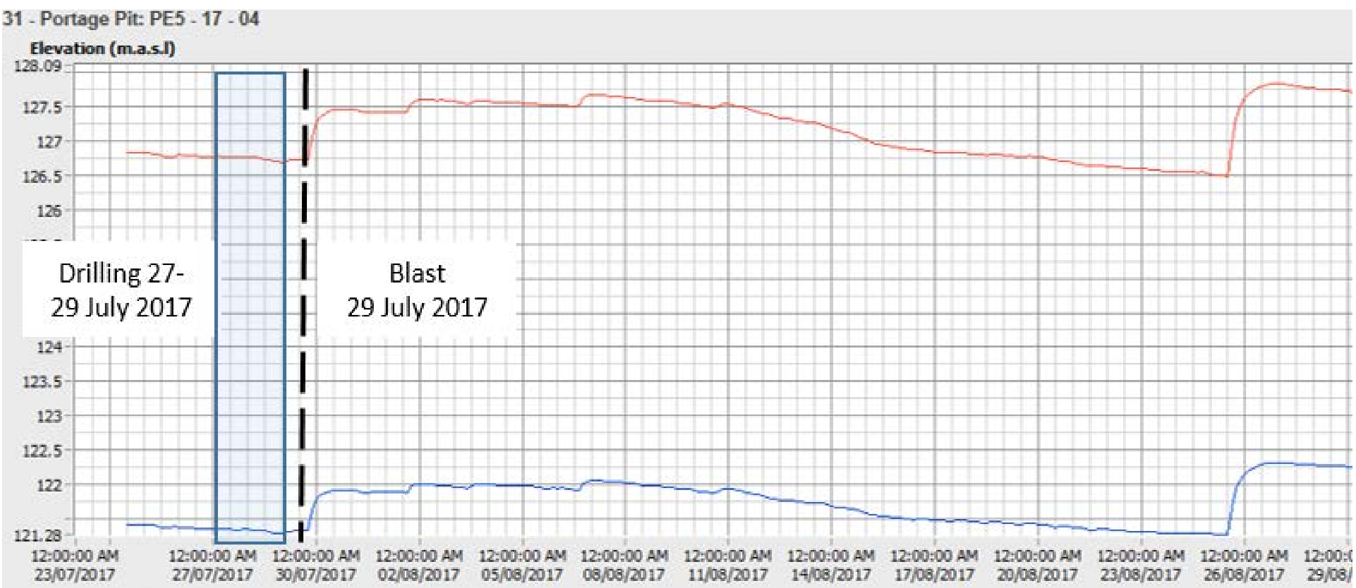


Figure 6-4: Instrument PE-17-04 piezometer response to blast

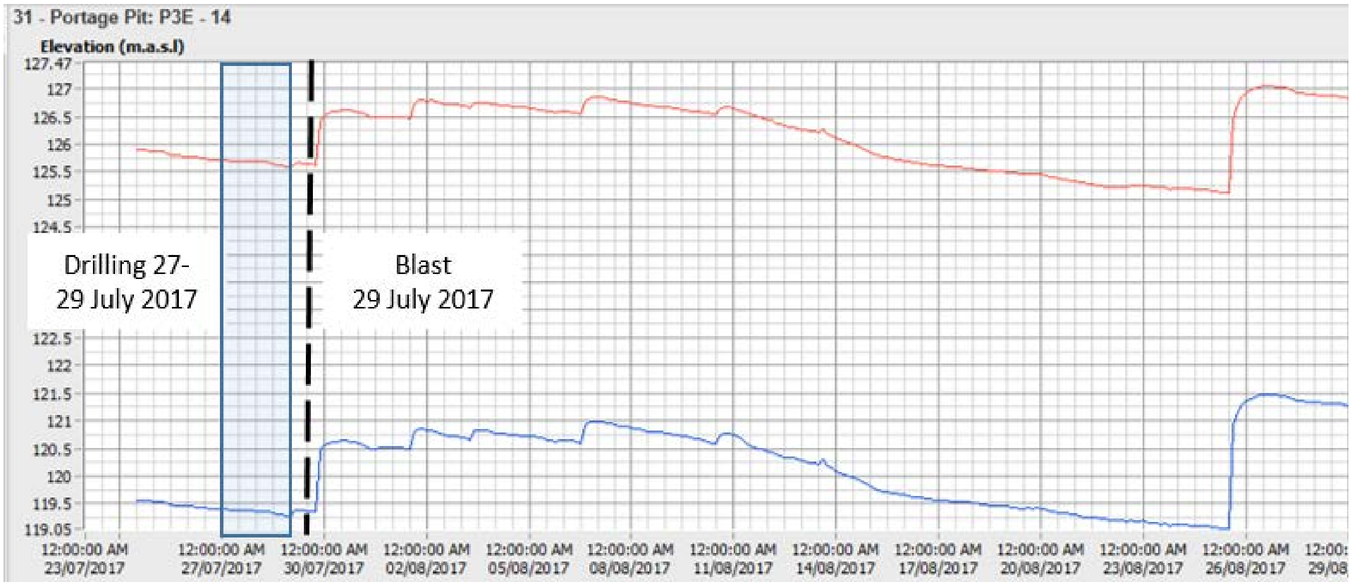


Figure 6-5: Instrument PE3-14 piezometer response to blast

The responses in the piezometers are considered to be consistent with the current conceptual hydrogeological and engineering geological model which includes a central structural zone extending through the south wall of the pit (through the former failed wall), and is hydraulically connected to Third Portage Lake. The rapid and large drop in pressure in the one piezometer nest, followed by relatively rapid recovery, is suggestive of a hydraulic connection between the location of that piezometer, and the drilled blast pattern at the toe of the slope, while the rapid and smaller increase in pressure in the other piezometers, followed by a slower recovery, is suggestive of other lower conductivity zones.

A detailed review of the piezometer data is not part of the current scope, and AEM should consider such a review. However, it is understood that AEM frequently monitor the instrumentation and investigate all events. Some of the piezometers appear to be on an upward trend, and so the instrumentation data should be reviewed more frequently to understand if this trend is real. AEM have indicated the upward trend in the piezometer data is most likely related to the advancement of permafrost into the wall, as indicated by other instrumentation both in the wall, and in the dewatering dike.

6.2.6 Inclinometer

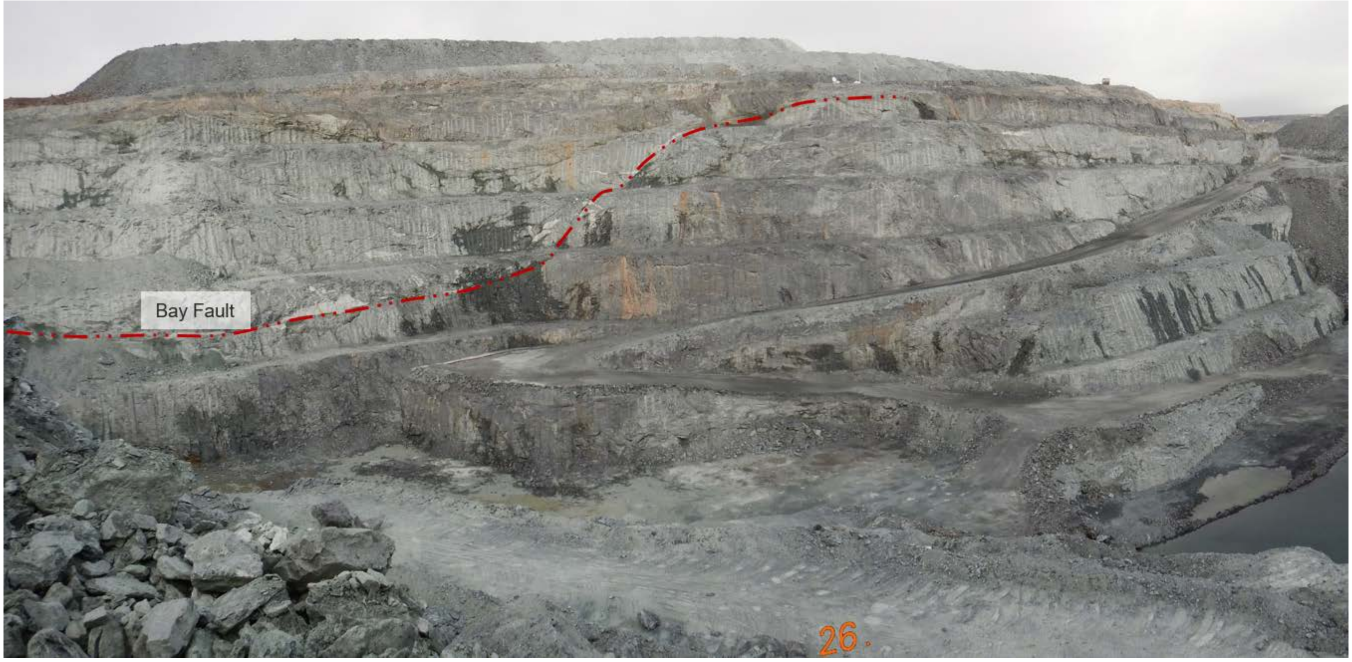
One inclinometer was installed in a dedicated borehole behind the wall. AEM noted that the data are questionable after May 1 2017, as a result of a malfunctioning thermistor at Sensor 16. A review of the temperature data show a sudden decrease in temperature from around 0 degrees C to -30 to -40 degrees C. These are significantly lower than any ground temperatures in adjacent instruments, and unrealistic for any permafrost conditions at this depth (above the depth of zero annual amplitude ground temperature can be as low as ambient air temperature depending on location within this zone). Since the displacements are temperature compensated, the data must be considered unreliable at this time. It was suggested that AEM contact the manufacturer and request guidance on how to best resolve this. A review of the TDR cables in adjacent boreholes did not indicate any shear displacements within the measured lengths.

6.3 Pit E West Wall

The Pit E west wall exposes predominantly quartzite, iron formation and intermediate volcanic rock in the upper benches of the wall, overlying ultramafic rock in the lower benches. Ultramafic rock is exposed along a substantial portion of the ramp as it descends into the pit. The west wall has been advanced to the south to form a narrow slot at the southwest end of the pit.

Seepage is observed along fracture planes exposed in the bench faces, particularly near the south end of the west wall as this area was originally in talik, beneath the previously existing Third Portage Lake. Seepage faces can be expected to contribute to instability of the ultramafic and other rock types during cyclic freeze-thaw. While stable through the winter, these areas may be prone to increased raveling and bench scale failure during the spring thaw. Additional care should be taken during spring thaw to identify potentially unstable areas of the pit wall and address these if required.

At the south end of the west wall, the contact of the ultramafic rock and overlying intermediate volcanic rock is inclined into the wall, which is beneficial for overall slope stability, but results in bench-scale instability of the underlying ultramafic rock. Local rock falls creating small overhangs have occurred as the ultramafic rock separates from the overlying volcanic contact, followed by sliding along a steeply east dipping orthogonal joint set. This potential instability is exacerbated by the presence of shear zones and the Bay Fault within the ultramafic rock, which are inclined steeply into the west wall.



Photograph 6-11: Pit E west wall showing seepage and Bay Fault (2017)

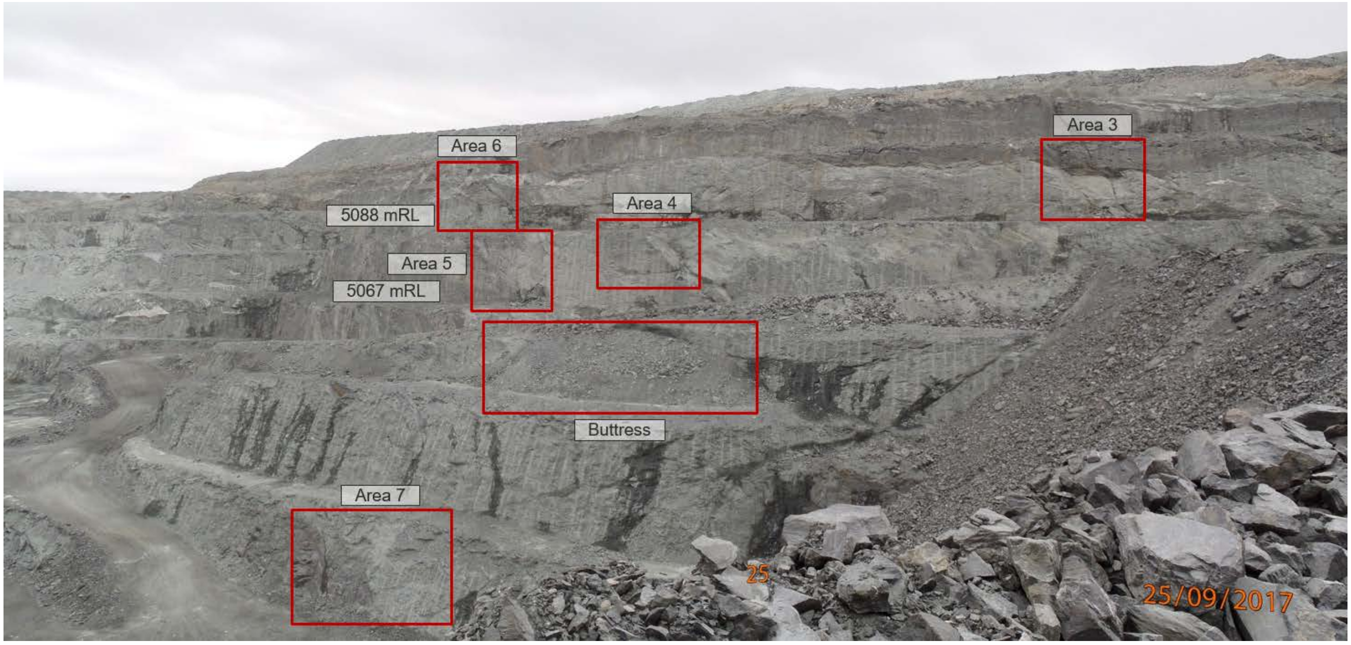
Mining down of the Pit E pushback area has now started to fill some of the benches. Since there currently are no mining activities being carried out below the pushback, this is not considered to be a hazard. These benches will be mined out, as new final benches are created during mining.

Photograph 6-12: Pit E west wall south end upper benches (2017)

6.4 Pit E3 West Wall Ramp

The Pit E ramp descends southward into the pit along the west wall. Seven areas of potential kinematic instability identified during previous inspections continue to be monitored in 2017, and are shown below.

Photograph 6-13: Pit E west wall ramp areas of potential instability (2017)



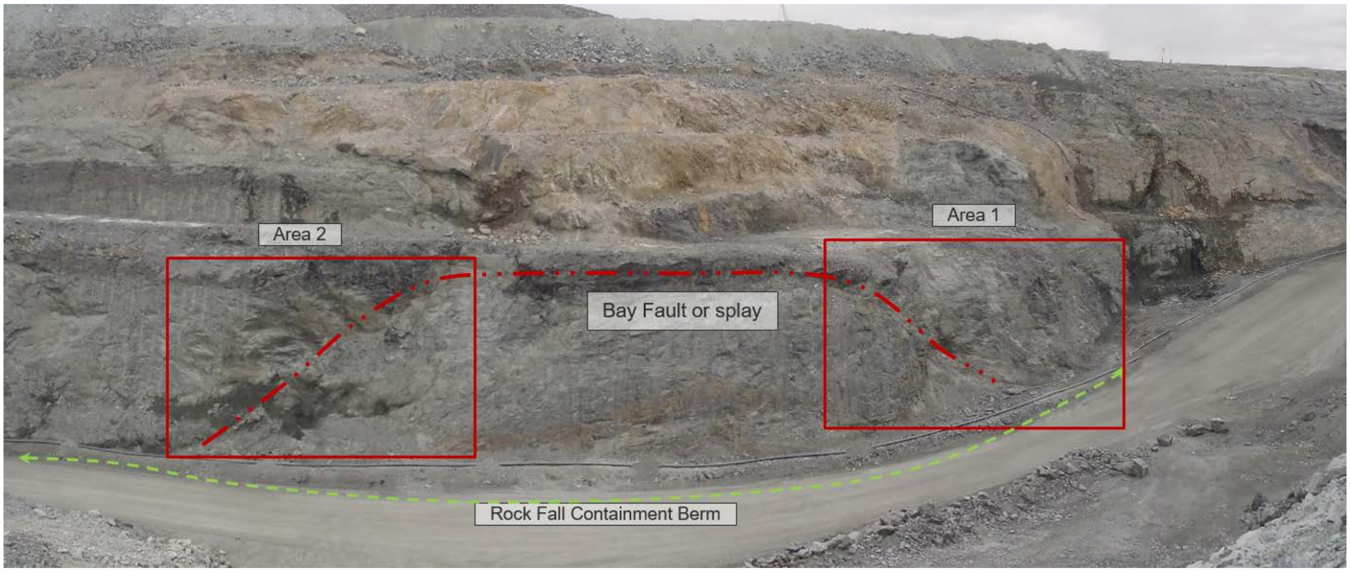
Photograph 6-14: Pit E west wall ramp areas of potential instability (2017)

The rock fall containment berm constructed along the west edge of the ramp continues to provide adequate catchment for rock falls that have occurred along the west wall above the ramp.

6.4.1 Ramp Areas 1 and 2

The ramp passes beneath an area of wall that was experienced several rock falls in 2014 (Area 1 and Area 2). The area of wall is associated with a fault zone – possibly the Bay Fault or a splay off that fault trend - trending along the west wall of the pit. This fault, or shear, is several metres wide, and steeply inclined to the west.

Photograph 6-15: Pit E Ramp Area 1 above ramp - Bay Fault or splay (2017)



Photograph 6-16: Pit E ramp Areas 1 and 2 -Bay Fault or splay (2017). Note final bench height is 21 m

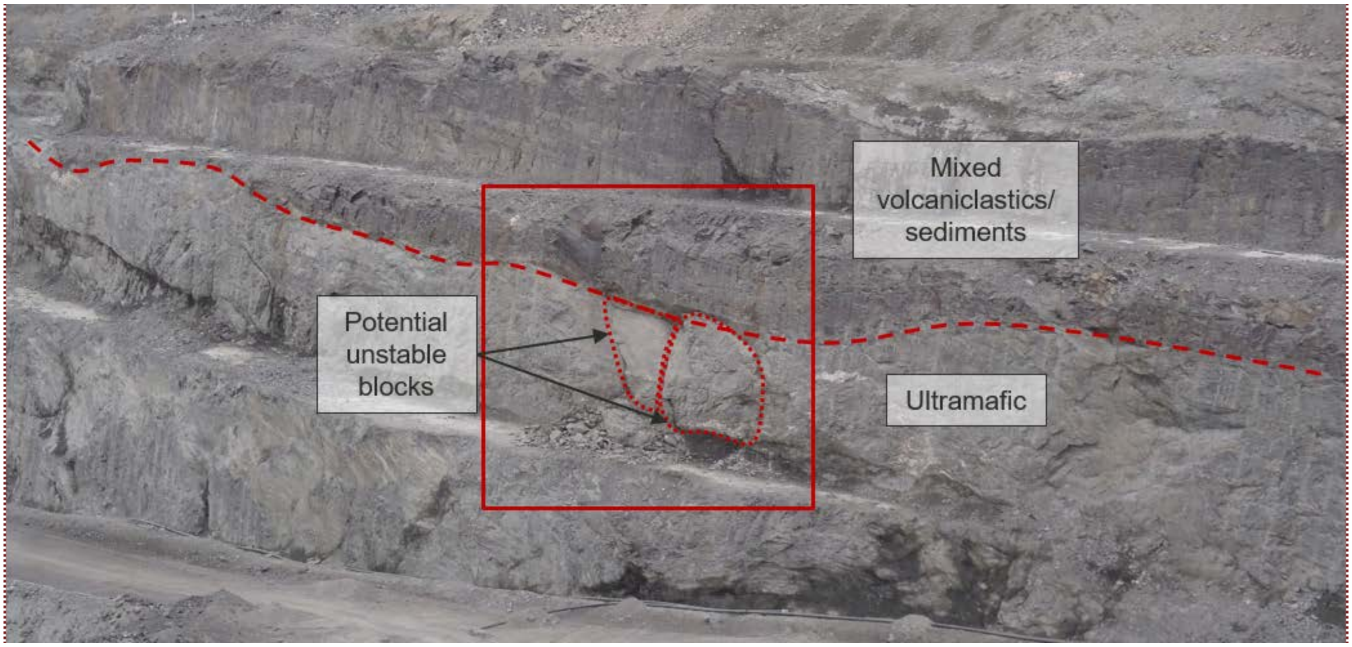
The following actions are recommended:

- Maintain the rock fall containment berm on the ramp.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

6.4.2 Ramp Area 3

Area 3 occurs at the contact between ultramafic rock and overlying volcanic rock inclined to the west and into the slope. The contact forms a top release surface for a wedge formed within the ultramafic rock.

No increase in the material accumulating at the toe was noted during the 2017 inspection. The combination of the 5088 mRL bench, and the containment berm on the ramp is adequately managing the potential for rock fall in this area. A location of additional instability has been highlighted previously that might eventually fail with time due to freeze-thaw processes.



Photograph 6-17: Pit E ramp Area 3 wedge (2017)

The following actions are recommended:

- Maintain the rock fall containment berm on the ramp.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.
- In particular monitor for additional failure to the right of the existing failure as shown in Photograph 6-17.

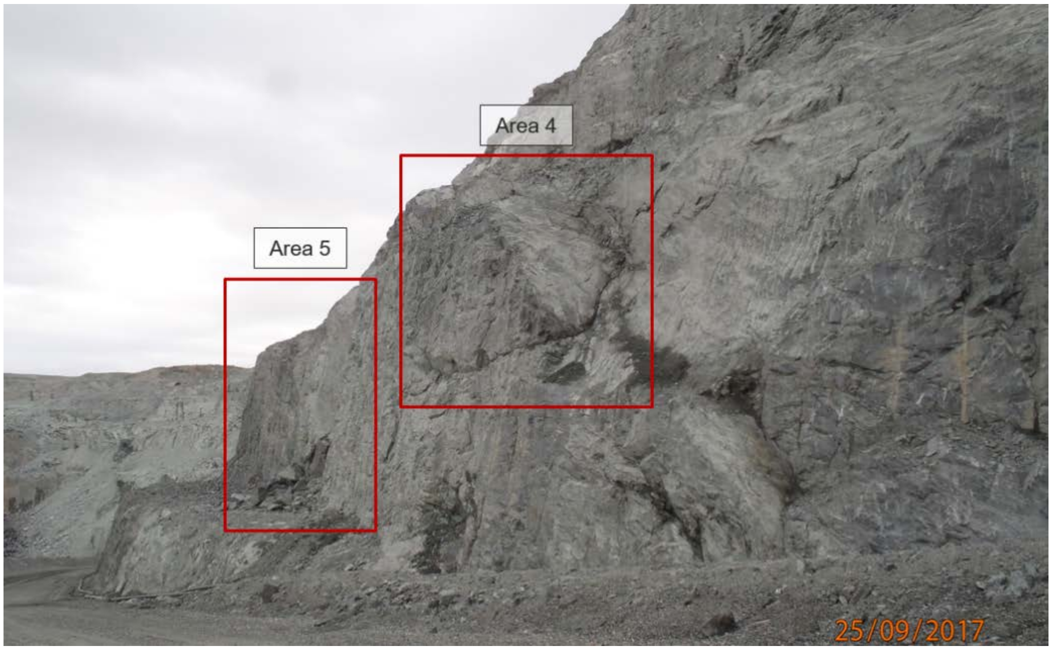
6.4.3 Ramp Areas 4, 5 and 6

Area 4 is a potential planar failure formed by a steep east dipping sliding plane undercut by the bench face. The sliding plane is exposed adjacent to Area 4 on a portion of wall that was removed through scaling. The plane extends behind the Area 4 block, and daylights in the bench face. The rock fall containment berm on the west ramp extends beneath the rock block to manage the risk associated with the potential failure of this material.

Area 5 is defined by a series of closely spaced bench-scale joints trending into the wall, and forming steeply plunging wedges.

Area 6 is located above the 5088 mRL bench, and is a vertical extension of the closely spaced jointing of Area 5. These are steeply north dipping shear joints, which intersect the volcanic rock. The close spacing and continuous nature of these joints may result in increased raveling of material particularly during freshet and spring thaw. No new material was observed to have failed on to the 5067 bench since the 2016 inspection.

Photograph 6-18: PIt E ramp Areas 4, 5, and 6 (2017)



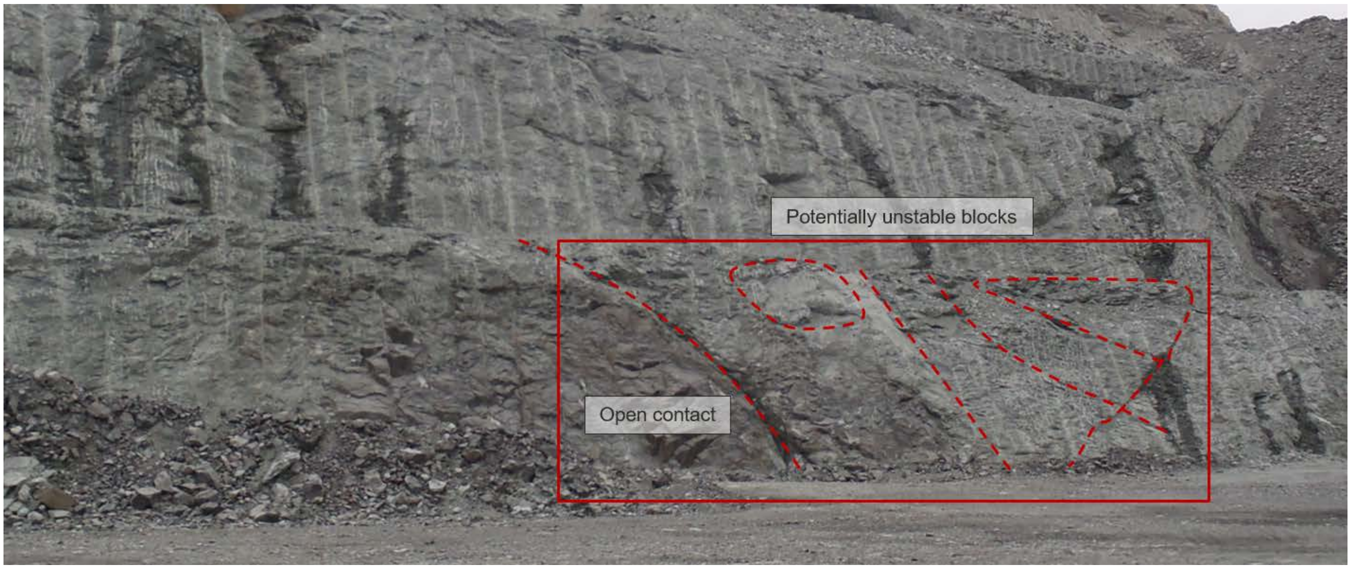
Photograph 6-19: Pit E ramp Areas 4 and 5 viewed from ramp (2017)

The following actions are recommended:

- Maintain the rock fall containment berm on the ramp.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

6.4.4 Ramp Area 7

Area 7 is at the base of the ramp, at the north end of the pit, and near the contact between iron formation and ultramafic rock.



Photograph 6-20: Pit E ramp Area 7 at bottom of ramp

The potential instability is characterized by strongly sheared ultramafic rock in contact with iron formation, with associated shear planes dipping out of the bench face. Some of the sheared planes are open and appear to form potential wedge and planar mechanisms. The geometry is to some degree similar to the instability that was encountered adjacent to the ramp in the Goose Pit in 2014. A safety berm should be constructed along this section of ramp to prevent personnel and equipment from stopping beneath this area. The area should continue to be monitored as part of regular site geotechnical inspections.

The following actions are recommended:

- Construct a bumper berm along the bench toe of this section.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

6.4.5 West Wall Ramp - Ramp Buttress

A ramp instability identified in 2015 by AEM and associated with the weak ultramafic rock in the lower wall benches below the ramp was mitigated with the construction of a counter-balancing rock fill berm. This was documented during the 2015 inspection. The berm continues to be effective at stabilizing the ramp. There is no indication of deformation within the buttress or the ramp surface, or tension cracks along the ramp crest.

Photograph 6-21: Pit E west wall ramp buttress and step-in (2017)

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

6.4.6 Pit E Slot South and East Wall

The slot mined at the south end of Pit E has been partially filled with waste rock pushed over the edge of the pushback area as it is being mined down. The area is currently closed. Consequently, bench scale instability within the lower portions of the wall no longer present hazards.

The following actions are recommended:

- Continue careful scaling and bench cleaning as the pushback is deepened.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

Photograph 6-22: Pit E slot south and east wall

7.0 GOOSE PIT INSPECTION

Mining of the Goose Pit to a final floor elevation of 4997 mRL was completed in 2015. End dumping of waste rock to the northwest corner of the pit near the access ramp entry point (North Dump) was carried out in 2016, finishing in June of that year. Dumping recommenced in 2017 creating a second but contiguous dump south of the first (South Dump).

On the day of the Goose Pit site inspection (September 25 2017), the elevation of the pit lake was at 5064.9 mRL. The inspection of the Goose Pit comprised a series of stops around the crest of the pit for an overview of the current conditions. The pit is closed, but light vehicle access can be gained by the ramp on a small road crossing the south dump.

Slope monitoring instrumentation is installed along the east crest of the pit, in the in-field between the pit crest and the Bay Goose Dike toe. In addition to the observations made during the site visit, the data from thermistors, TDR cables, and piezometers were reviewed.

7.1 Goose Pit East Wall

The east wall of the Goose Pit was excavated predominantly in intermediate volcanic rock and iron formation. The stratigraphy is inclined steeply at a constant angle to the west. Steep bench faces were achieved with the use of careful pre-shear blasting. There has been very little loss of catchment, and very little accumulation of material on the benches.

The following photograph shows the east pit wall looking north.

Photograph 7-1: Goose Pit east wall looking north (2017)

The east wall continues to perform satisfactorily and there are no immediate geotechnical concerns.

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.
- Continue collecting and reviewing data from instrumentation.

7.1.1 Goose Pit Instrumentation

As part of the site inspection, the instrumentation data from Time Domain Reflectometry (TDR) cables, thermistors, and piezometers installed in the east pit wall were reviewed. AEM have reported that the TDR100 data logger used at Goose Pit has been moved to replace the broken TDR100 data logger at Portage Pit. The broken data logger is currently being repaired. AEM have also added functionality to the instrumentation system through the addition of GeoExplorer software for easier access and visualization of data. A location plan for the instrumentation is shown in the following figure, and the data are presented in Appendix B.

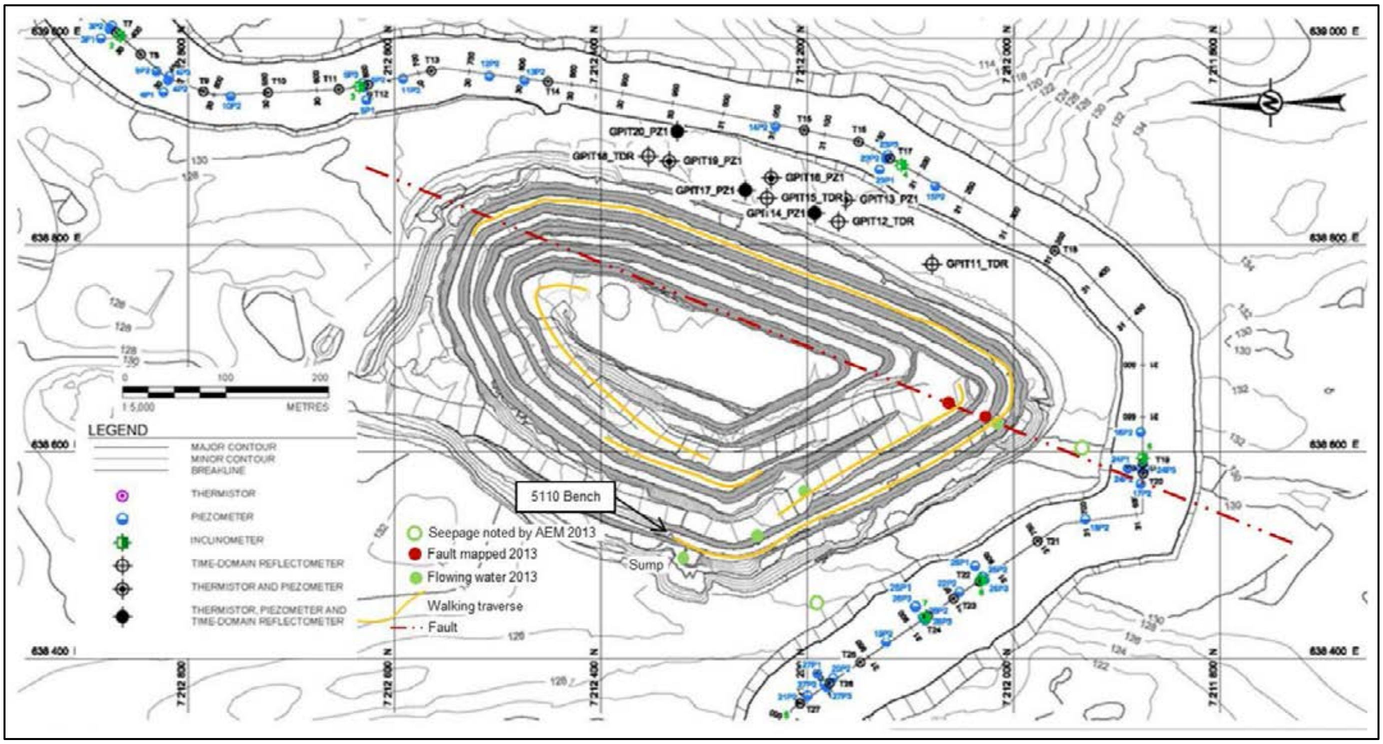


Figure 7-1: Goose Pit instrumentation plan

7.1.1.1 TDR Cables

Seven TDR cables were installed in geotechnical boreholes drilled behind the east wall of the Goose pit in 2013 to monitor slope movement. A review of the data indicates no shear displacements. The response for TDR GPIT-14 is erratic, suggesting it is damaged.

7.1.1.2 Thermistors

Thermistors were installed in 6 geotechnical boreholes drilled behind the east wall in 2013. A review of the data indicates no significant change from 2015. The data indicate generally steady-state conditions although data from GPIT-14 show a cooling trend between approximately 5090 and 5000 mRL. This trend was first visible in the August 2014 data, and has been consistent in 2015, 2016, and 2017.

Despite the current pit lake elevation of 5065 there does not appear to be any change in the ground thermal regime in the east wall as a result of this, based on the thermistor data.

7.1.1.3 Piezometers

Piezometers were installed in 6 geotechnical boreholes drilled behind the east wall in 2013. A review of the piezometer data comparing 2016 with 2017 has included a review of the ground temperature at each piezometer tip. While there are some fluctuations in pressure head for certain piezometer tips from year-to-year, many of the tips are at 0 degrees C or slightly below. Consequently the reliability of these pressure readings is questionable. It should be recognized that unfrozen water can exist at sub-zero temperatures due to freezing point depression (from water salinity and overburden pressures), however this possibility cannot be evaluated further with the existing data. It is likely the pressure fluctuations are related to the sub-zero temperatures. The review of the temperature data showed reasonable year-to-year consistency; temperatures in GPIT-17 show a slight cooling trend.

Brief descriptions of observations made for each installation are provided below:

GPIT-13 shows no significant change in pressure head from 2016 to 2017. The PZ-2C shows a slight decrease in temperature. All other temperatures are relatively unchanged, and with the exception of PZ-1 are positive.

GPIT-14 PZ-4C during 2016 was noted to show a decrease in pressure head from about 5043 m to about 4980 m from January to November 2016. This was similar to responses noted in 2015. In 2017 the same piezometer tip was noted on a slight upward trend increasing from about 4985 mRL in April 2017 to 4988 mRL. This tip may be damaged. There is no significant change in ground temperatures at the piezometer tips. PZ-4 and PZ-5 show positive temperatures, while the remainder are negative so the reliability of pressure data is questionable.

GPIT-16 shows a small fluctuation in pressure head between 2016 and 2017 (both increasing and decreasing) which are likely general fluctuation in groundwater pressures. Ground temperatures remain relatively constant from year to year at the piezometer tips. Three of the piezometer tips – PZ-7, -8, and -9 – show positive temperatures, while the remainder are negative so the reliability of pressure data is questionable.

GPIT-17, tip PZ-5C shows a significant increase in pressure head from 2016 to 2017 of 57 m to 5026 mRL. Since all piezometer tips are at negative temperatures the reliability of the pressure data for the installation is questionable. The temperature at PZ-5C is around 0 degrees C, or marginally below, and so this piezometer could be responding to pressures changes associated with fluctuation between frozen and unfrozen conditions. There is slight cooling trend for all the thermistors at the piezometer tips.

GT-19 shows no notable change in pressure head, or in ground temperatures. With the exception of one piezometer tip, all show negative temperatures and so the reliability of the data is questionable.

GT-20 shows relatively constant pressure head for 3 of the 5 installed piezometer tips. PZ-3C and PZ-4C show and increase of 10 to 15 m pressure between 2016 and 2017. There is no notable change in ground temperature at the tips. Since all piezometer tips are at negative temperatures the reliability of the pressure data is questionable.

7.2 Goose Pit South Wall

The south wall of the Goose pit comprises iron formation and intermediate volcanic rock in the east, transitioning through a sequence of iron formation, ultramafic rock, quartzite, and mixed volcaniclastic sediments in the west. The most prominent structural feature is the Bay Fault which intersects the south wall of the pit, within the ultramafic rock. The various lithological units are shown in the following photograph.

Photograph 7-2: Goose Pit south wall (2017)

The performance of the bench overall south wall continues to be satisfactory. There is no evidence of instability and no additional accumulations of material on the benches since 2015 were observed. There are no significant geotechnical concerns for the Goose Pit south wall.

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

7.3 Goose Pit West Wall

Much of the west wall of the pit is now covered and buttressed by a waste rock dump (South Dump) which conceals or partially conceals many of the instabilities noted during previous inspections, and now acts to buttress those instabilities.

The upper west wall of the Goose Pit is comprised of mixed sedimentary and volcaniclastic rocks at the crest, overlying quartzite. The lower benches of the pit expose poor quality ultramafic rock. The stratigraphic contacts dip at moderate angles into the pit wall to the west. The ultramafic rock is characterized by relatively closely spaced sheared joints or foliation, dipping at steep angles to the east. Localized failures occur where these are undercut by bench face angles. The quality of the ultramafic rock degrades over time with exposure to air and water.

Photograph 7-3: Goose Pit west wall (2017)

There are no observable changes to the hydrogeological regime. The rock immediately below the sheared contact remains saturated, and water continues to seep from the face above the ramp, as well as from the bench faces below the ramp.

There are no significant geotechnical concerns noted with the performance of the west pit wall of the Goose Pit, and no evidence of large scale (overall slope) instability was noted. The material dumped into the pit is considered sufficiently free draining that any water at the dump/rock interface will percolate to the pit lake.

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

7.3.1 Goose Pit Waste Rock Dumps

Waste rock dumping into the Goose Pit stopped in July of 2016 at the North Dump, and recommenced in 2017 with dumping at the South Dump. Dumping from the South Dump stopped in September 2017, and currently, there is no active dumping at Goose Pit. A line of candles establishes a no-entry boundary to the dump platforms. The toe of the dumps extends out into the Goose Pit Lake.

Photograph 7-4: Goose Pit waste rock dumps (2017)

Several large tension cracks were noted during the 2015 inspection of the North Dump platform, between 10 m and 20 m back from the dump crest. The tension cracks are curvilinear and extend the full width of the dump platform. It was noted during the 2015 inspection that approximately 30 cm of vertical displacement across the cracks and lateral separation (opening) had occurred. During the 2016 inspection, it was observed that the vertical displacement across the cracks has increased due to dump crest settlement. Additional tension cracks were also observed at that time.

The South Dump did not exist in 2016. During the 2017 inspection of the South Dump, tension cracks were noted on the dump platform. AEM were aware of the tension cracks and had been monitoring the dump platform during active dumping. Currently there is no dumping activity, and the extensometer has been removed.

AEM began monitoring the dump platform stability in 2015 using simple wireline extensometers installed across the tension cracks, and established a set of procedures to implement based on relative movement magnitude.

During active dumping the extensometers were read several times daily. The protocol established for monitoring of the dumps is presented below.

Table 7 1: Waste dump monitoring protocol

Status	Daily rate of movement		Interval between readings	Action required
	from	to		
1	0	170	4 hours	Normal
2	170	250	2 hours	Caution advised
3	250	330	1 hour	Caution advised, visual observation important
4	330	500	1 hour	Short dump only. Alternative dump location if possible.
5	500		1 hour	STOP DUMPING in this area and close the dump. Use alternative dump locations.

*** Do not modify this table**

On only 2 occasions during the monitoring periods was the Category 5 Status recorded, and on only 1 occasion was the Category 4 Status recorded. The dumps have operated primarily within the Category 1 and 2 Status based on the instrumentation installed and the data provided.

Prior to commencing of active dumping a dump inspection should be carried out, and an action plan developed that might include frequent inspections of the crest area, and the installation of additional instrumentation.

The following actions are recommended:

- If the dump is to be reactivated, carry out a dump inspection and develop an action plan for inspections and monitoring.
- Continue to limit access to the dump platform areas.
- Mark the position and extents of the existing tension cracks on a dump plan for on-going monitoring purposes.
- Measure the vertical displacement across the tension cracks as a record of settlement.
- Install wireline extensometers to measure future movement.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

7.4 Goose Pit Northwest through Northeast Walls (North End-Wall)

The northwest through northeast (north end-wall) walls of the Goose Pit exposes the stratigraphic sequence of the deposit, from ultramafic rock in the west, through iron formation, and then intermediate volcanic in the east. The stratigraphy and major structural features (faults and dominant foliation) strike approximately perpendicular to the wall, and dip at about 60 degrees to the west. The wall also exposes the Bay Fault, and associated splays.

Photograph 7-5: Goose Pit northwest through northeast wall (north end wall 2017)

The northwest through northeast walls of the pit are almost entirely covered by the North Dump. As such many of the previous areas of instability are covered and no longer present any significant hazard. Seepage is still noted on the north end-wall in association with the main structural features intersecting the wall, and the seepage face is

There are no significant geotechnical concerns noted, and no evidence of large scale (overall slope) instability for the north end-wall of the closed pit.

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

8.0 VAULT PIT INSPECTION

Although good access to all areas of the pit was possible during the site visit, the visibility at the Vault Pit on the day of the inspection was poor, with low cloud, fog, and rain. Mining of the Vault Pit continues to advance rapidly. At the time of the site visit, the Phase 2 pit had been excavated to 5025 mRL. Figure 8-1 shows the extents of the Vault Pit at the time of the site visit.

8.1 General Observations

The slope design criteria currently implemented at the Vault Pit are generally consistent with the design criteria recommended in the slope optimization study (Golder, 2013b). Catch benches are excavated slightly wider than recommended by Golder (2013b) resulting in slightly shallower inter-ramp and overall slope angles than presented for design.

The pit walls of the Vault Pit continue to perform well. Pre-shearing of the final bench faces has been effective at reducing wall damage and break back of crest areas.

Areas of over-break of catch benches on the north through northeast wall are predominantly associated with inclined planes dipping obliquely to the strike of the pit wall.

8.1.1 Water Inflows and Seepage

The locations for water inflows and seepage noted during the 2017 inspection remain the same as for previous inspections. There are three main areas of the pit where water inflow or seepage are noted. These are shown on the figure below and discussed in relevant sections. These are generally related to the dewatering of Vault Lake, and to release of water stored in the talik beneath the former lakes.

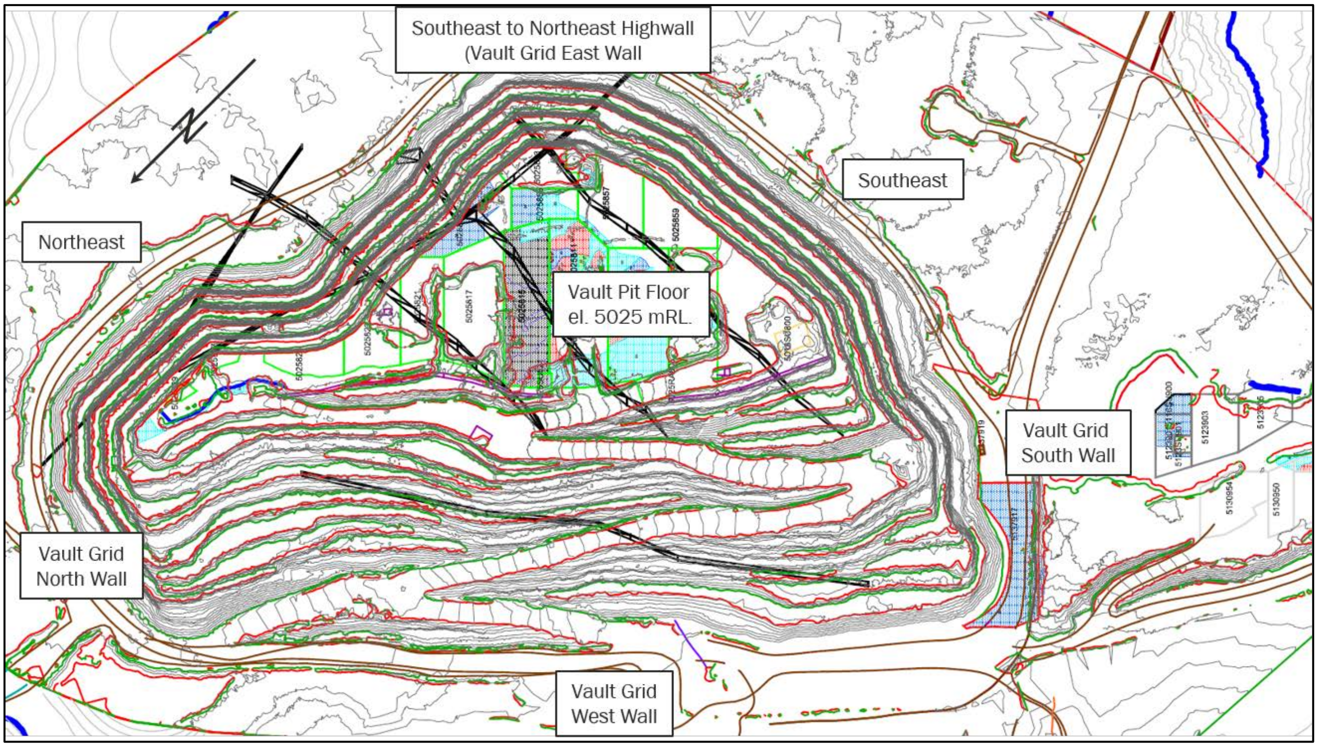


Figure 8-1: Vault Pit at time of 2017 inspection

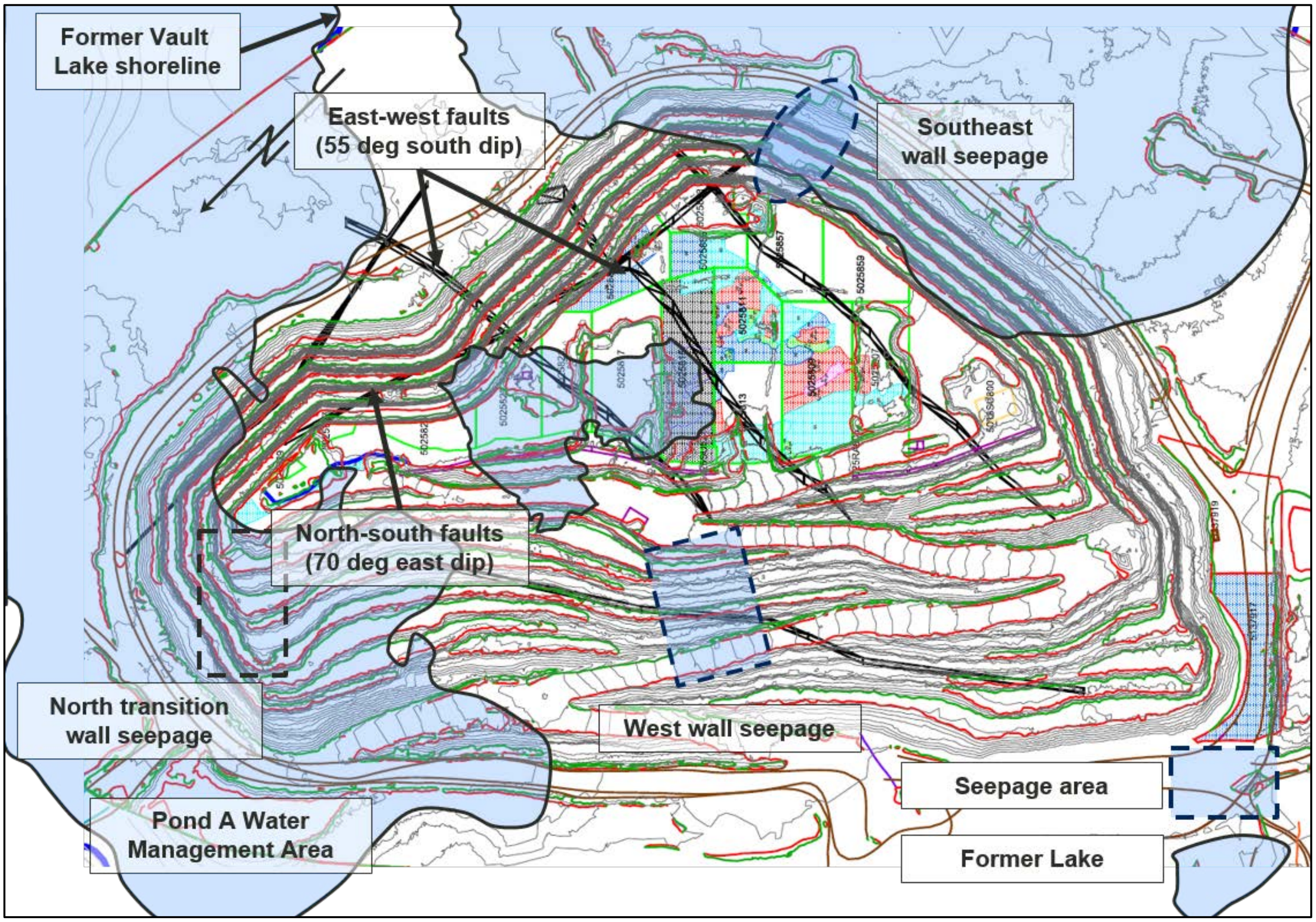


Figure 8-2: Vault Pit water inflow and seepage (2017)

8.2 Footwall Slope (Vault Grid West Wall)

The west wall (grid west) of the Vault is mined as a series of single-benches (7m high) to create a footwall slope. The deposit dips at relatively shallow angles to the east (grid east), parallel to the foliation and stratigraphy. The average inclination is 22 degrees, but ranges from as shallow as 10 degrees to as steep as 40 degrees. Bench faces are not pre-sheared but are bulk blasted at steep angles, and generally break back, or are scaled back, to the orientation of the foliation. Consequently, there are some benches with considerable loss of catchment. This was anticipated during the design process, and benches were restricted to single-height to minimize failure volumes and allow for this catchment loss. Since the inter-ramp slope angle is shallow at 33 degrees, the likelihood of larger scale multiple bench or overall slope failures of significant volume is low.

Within the West Wall Design Sector, average back break was estimated to be 1.3 m, with maximum back break of approximately 3 m (Golder, 2013b). Recent estimates of back break distances by AEM show the range in average back break to be from about 1.4 m to 3.7 m for this slope, averaging about 2.4 m which is slightly higher than the predicted back break.

Photograph 8-1: Vault Pit west wall looking north (2017)

Photograph 8-2: Vault Pit west wall looking south (2017)

There are no significant geotechnical concerns noted, and no evidence of large scale (overall slope) instability for the footwall slope.

- Continue to clean benches as mining deepens the pit.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

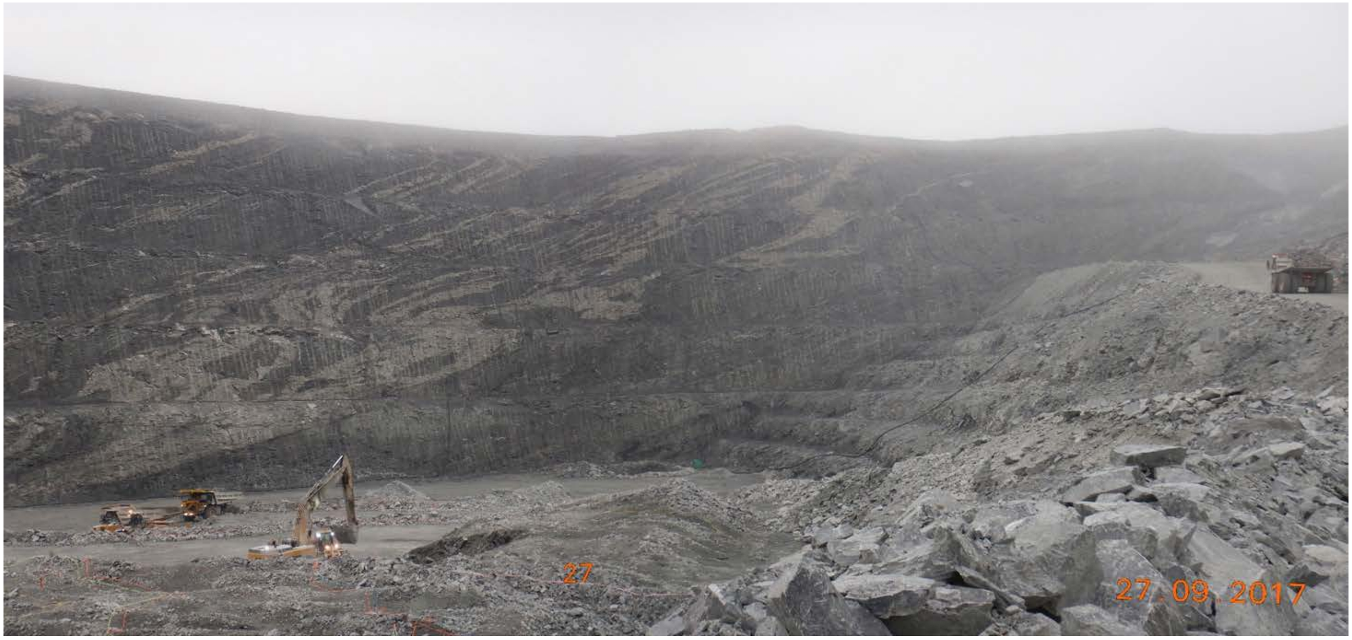
8.2.1 Footwall Seepage Area

An area of seepage centrally located along the west wall continues to produce small volumes of water. During the 2017 site inspection, seepage was noted down the full wall face. The volume of water being produced is not significant, and is not expected to contribute to any potential ice build-up or wall instability, other than some possible raveling of rock which will be contained on the catch benches. Routine maintenance of the drainage ditch should occur or else water seepage could freeze on the ramp at the corner where vehicles are braking or turning.

Photograph 8-3: Vault Pit west wall seepage

8.3 Southwest Wall (Vault Grid South Wall)

The southwest wall (grid south) intersects the stratigraphy and foliation perpendicular to their trend. The gently east dipping structure can be seen clearly in the wall. The overall wall continues to perform well, with little accumulation of material noted on the benches. The half barrel traces from pre-shear blasting are clearly visible on the wall, even from a distance. There is very little deviation noted for the blast holes.



Photograph 8-4: Vault Pit grid south wall (2017)

A small sump is in the southwest corner of the pit and manages water in this area. During the site visit, two outward dipping planes were noted above the sump area, forming shallow slivers of potentially unstable rock. The planes strike slightly obliquely to the wall orientation, and while they are kinematically free on their north extension, they do not appear to have any additional side release planes required for failure to occur. Nevertheless, it is possible with annual cyclic freeze-thaw that these could become destabilized and ravel.

Photograph 8-5: Vault Pit south ramp sump and out dipping planes

Photograph 8-6: Vault Pit sump and out-dipping planes

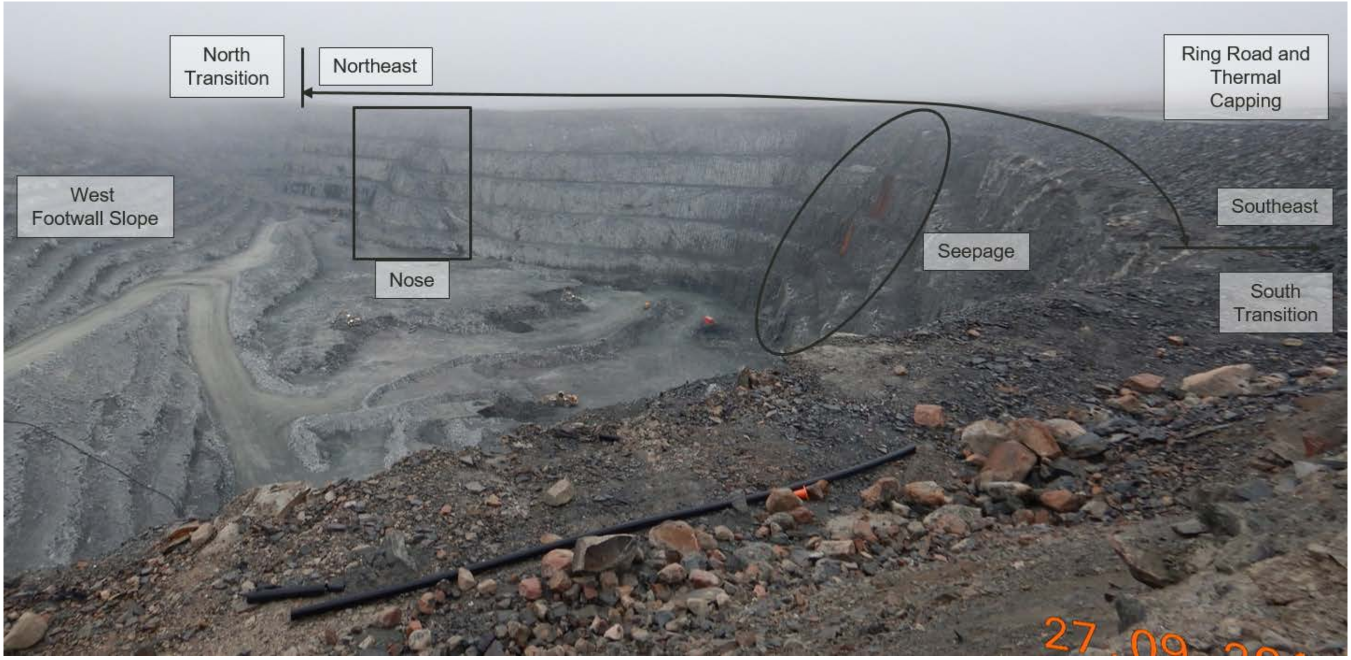
Since these features are directly above the sump area and associated equipment, and the area is regularly visited by personnel, these should be identified on a geohazard map for the pit and their presence communicated to anyone visiting the sump area. While the volume of material that might potentially fall is not anticipated to be large, a rock fall would present a risk to personnel, and could result in damage to water lines and pump equipment. Personnel should be reminded of safe work procedures relating to safe distance from rock faces, and should remain to the pit-side of the equipment container for safety.

The following actions are recommended:

- Communicate the hazards in the sump area to personnel and remain on the pit-side of the equipment container for safety.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

8.4 Southeast to Northeast Highwall (Vault Grid East Wall)

The southeast to northeast highwall (grid east wall) is being mined down from its final crest position. The wall is performing satisfactorily.



Photograph 8-7: Vault Pit east highwall (2017)

The final benches are being mined using pre-shear blasting methods, and are being excavated to 75-degree bench face angles. Half barrels from the blast holes are clearly visible in the walls and there is very little deviation in the borehole traces. The benches are cleaned well, and there is no indication of significant raveling and no significant accumulation of material on the benches. There is some over break of bench crests due to blasting but this is not significant. In general, the toe of the thermal capping material is greater than 2 m back from the pit crest.

Photograph 8-8: Vault PIt east highwall bench performance, southeast end looking north (2017)

Photograph 8-9: Vault PIt east wall northeast end looking south (2017)

8.4.1 Southeast Wall Seepage

An area of seepage on the southeast wall of the pit emanates from just above the 5109 mRL bench. The seepage results in the formation of a substantial ice wall during winter which presents operational challenges to the mining schedule. The possibility to intersect talik ground during excavation of the pit wall in this area was identified by numerical modeling during the 2013 optimization study by Golder. It was recognized that if the highwall were pushed back to intersect the talik beneath Vault Lake resulting in water inflows to the pit. During the 2017 site inspection water could be seen flowing down the southeast wall from an area just above the 5109 mRL bench, and a significant portion of the wall was stained with iron oxide.

The water inflows to the pit from the southeast wall have been most problematic during winter, when a large ice wall is formed. AEM have investigated the ice wall further, contracting an external consultant (Vertika) to provide advice on possible management options (Vertika, 2017).

AEM manage the water elevation in Pond D (former Vault Lake) at a low level to assist in lowering water levels behind the wall. Based on data provided by AEM, the pond elevation is being managed between approximately 5130 mRL (dry), and 5134 mRL.

Photograph 8-10: Vault Pit seepage from southeast pit wall 5109 bench (2017)

Photograph 8-11: Vault Pit Pond D water level at time of site visit (2017) – essentially dry

Instrument VP4 is located behind the seepage area, and consists of a thermistor cable and 3 nested vibrating wire piezometers. A review of the data, plotted against the elevation of Pond D, shows the response in piezometers VP4-C (el. 5116 mRL) and VP4-B (el. 5095 mRL) and suggests that when Pond D is drained, VP4-C is close to dry conditions, and VP4-B has significantly dropped. When water begins to accumulate in Pond D there is an immediate response from both piezometers.

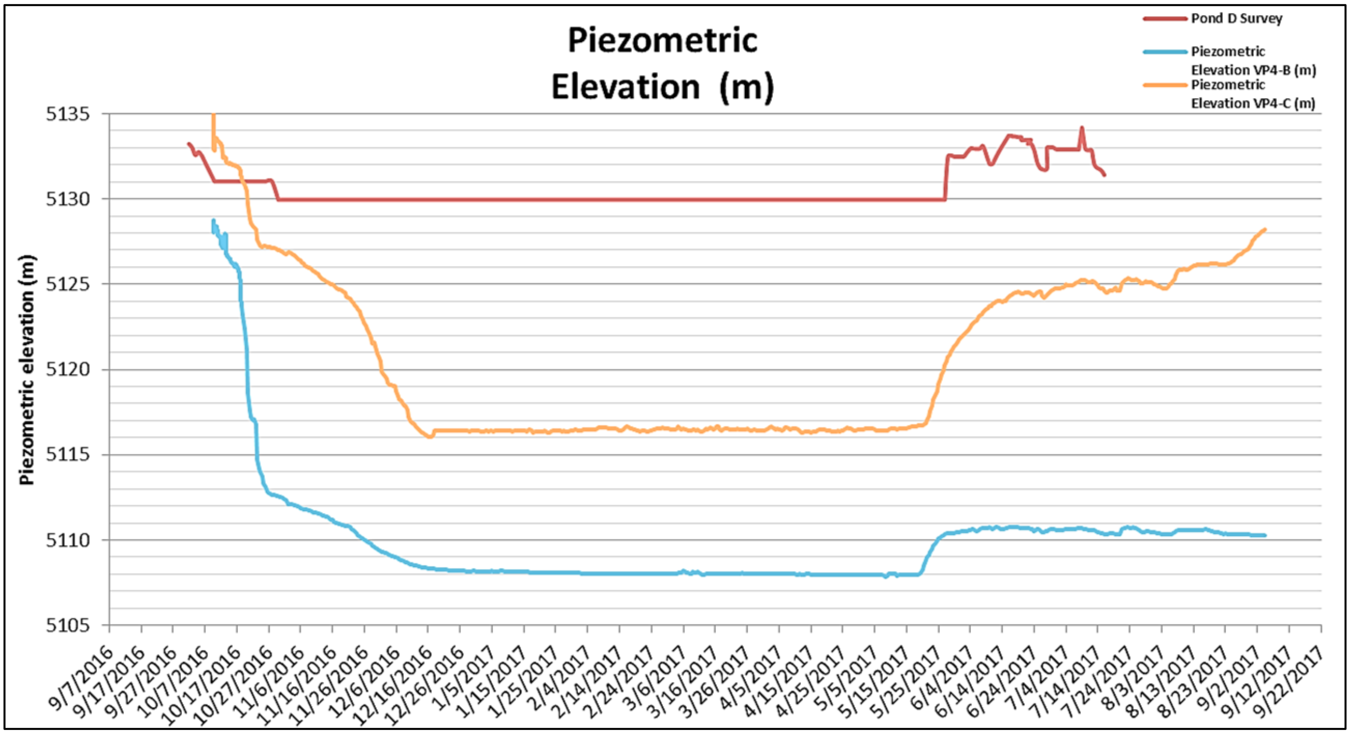


Figure 8-3: Response of VP4 to change in Pond D elevation (Ref. Appendix C)

A review of the thermistor data from instrument VP4 also provides useful information as shown in Figure 8-4. Selected data shortly following the installation of the thermistor in October and December 2016 are provided as a baseline reference only. The thermal profile suggests that freeze back of the seepage zone is in progress, but temperatures are still marginally above zero degrees C in the region that seepage is noted from the wall (as of September 2017), and so ice wall formation can be expected again this year.

It is possible that over time the talik will drain out provided that Pond D continues to be managed with a water level as low as possible, or even dry. The piezometers installed behind the wall should continue to be monitored to determine changes in piezometric head with time, and the thermistors should be monitored to determine the rate at which freeze back of the ground is developing.

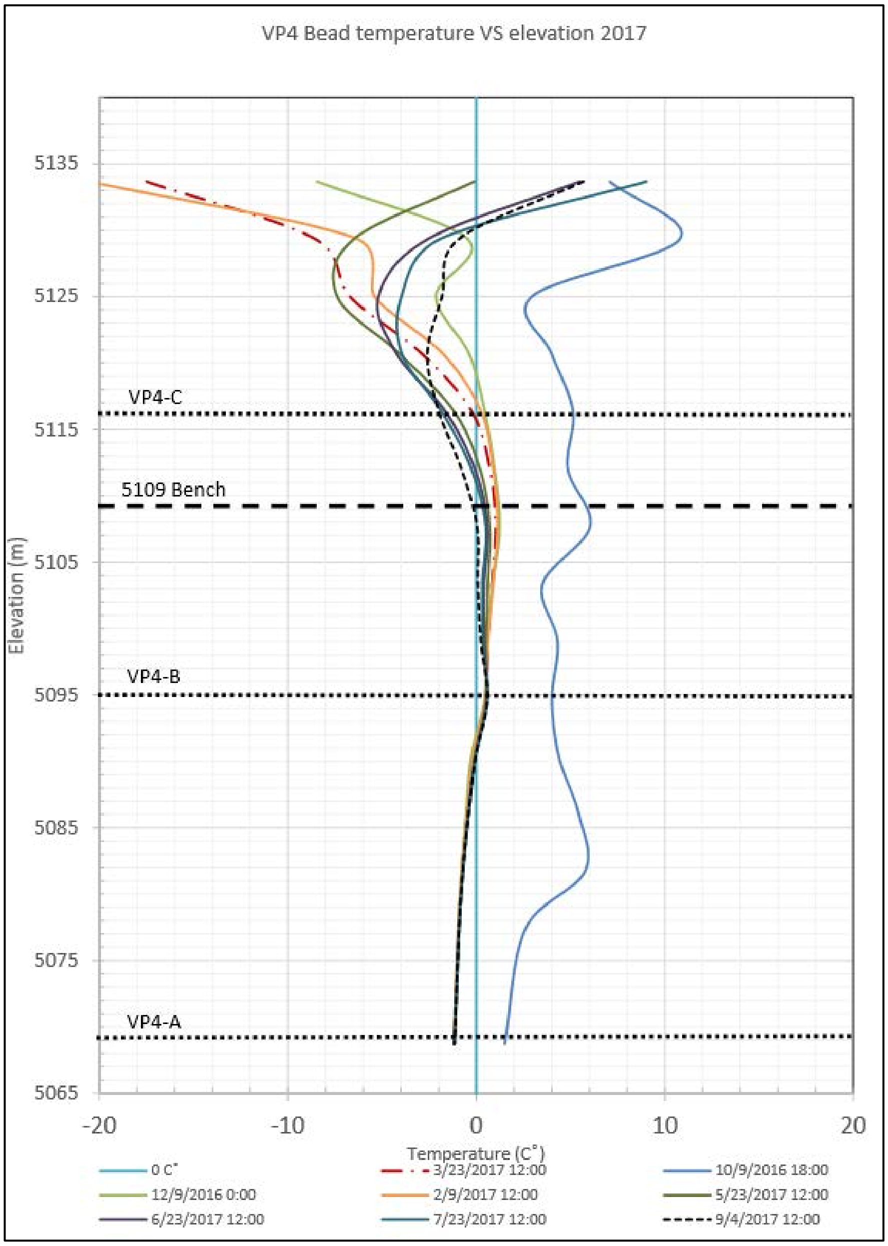


Figure 8-4: Vault Pit VP4 thermal profile

While the ground remains unfrozen, seepage through the rock towards the pit will continue and an ice curtain will continue to form in this area during winter. In winter this will present operational hazards due to potential ice falls.

The following actions should continue to be implemented.

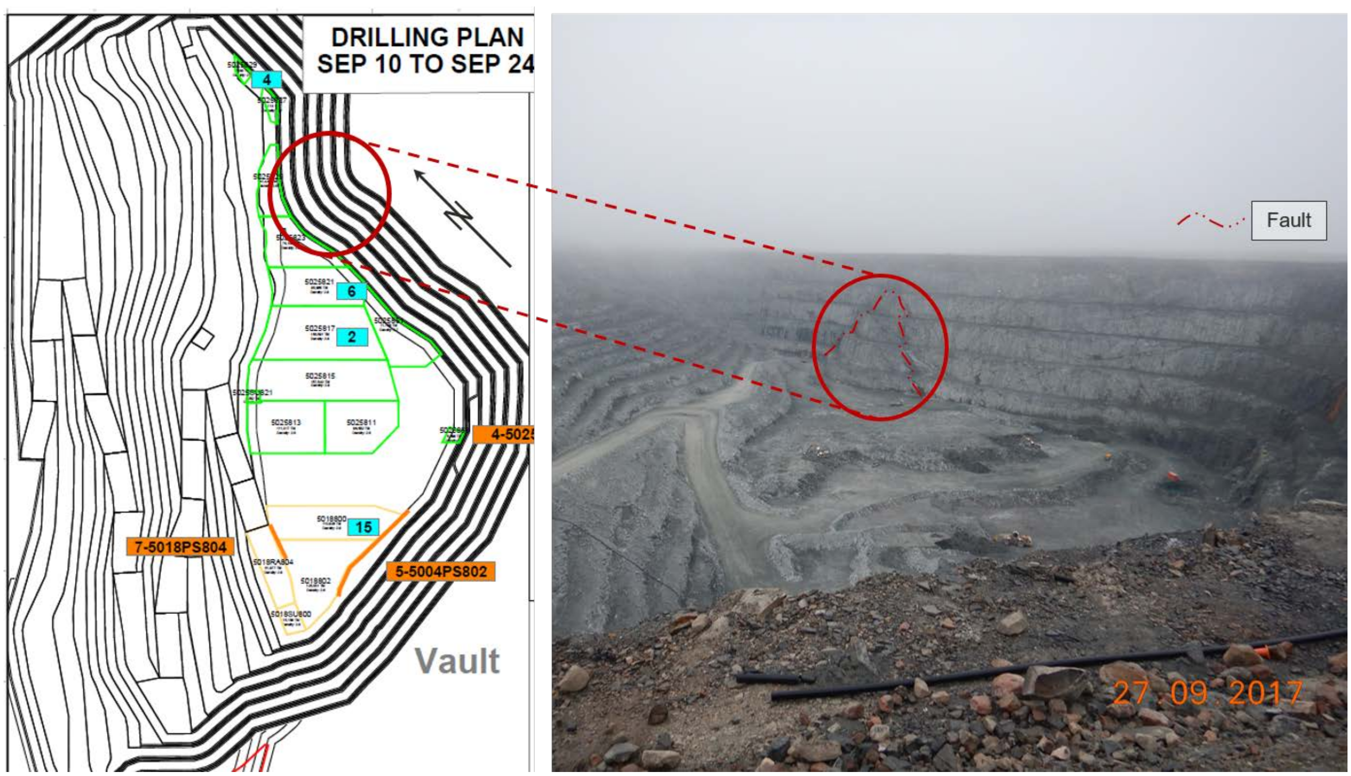
- Continue to monitor the piezometer and thermistor data from VP4 to build an understanding of the rate at which freeze back is occurring.

- Continue to manage the level of Vault Lake below the bedrock/till contact elevation to limit flow through the ring road or overburden materials, and to reduce the groundwater levels in the bedrock behind the seepage area.
- Continue to include standard ice wall inspection procedures and protocols as implemented by Vertika.
- Continue visual monitoring of the inflows on the pit wall as part of regular site geotechnical inspections.
- Monitor potential local raveling of material from the wall during spring freshet.

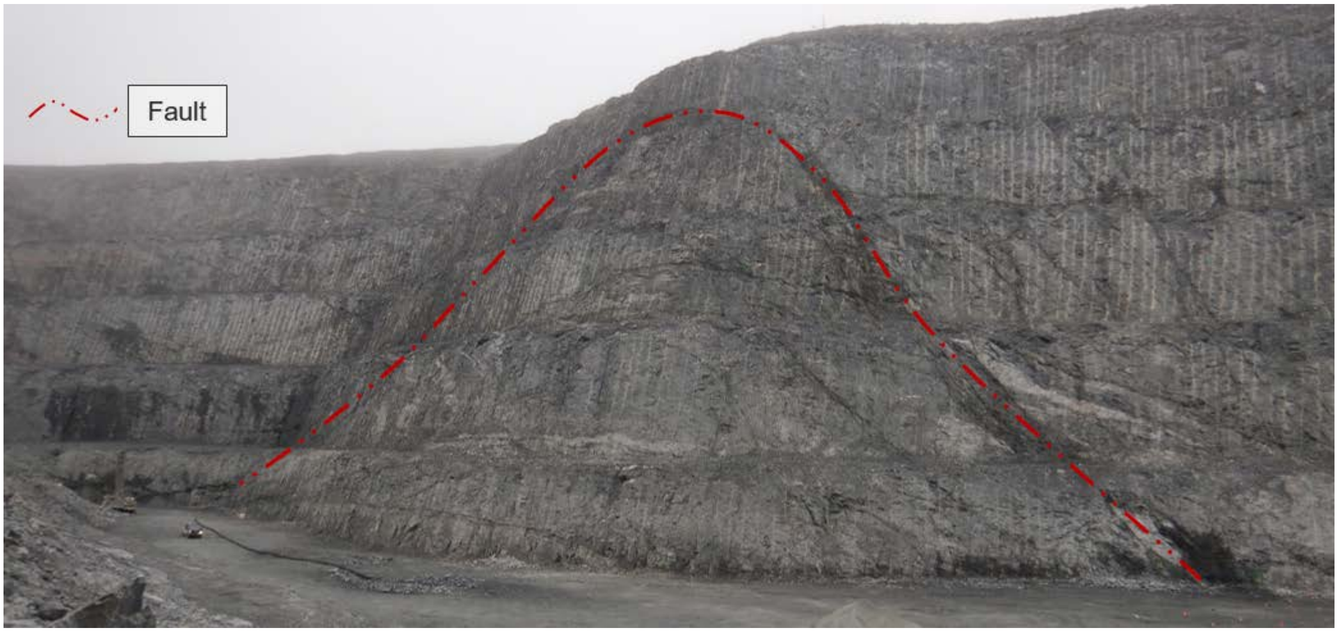
8.4.2 Highwall Nose Area

A minor change in wall orientation results in the formation of a 'nose' in the highwall near the northeast end of the wall. This sector of the wall has been developed within permafrost, and there are no apparent seepage faces on the wall.

A series of widely spaced faults and open continuous joints dip into the nose area at steep angles. The orientation of these structures could conceivably result in the development of toppling type failure mechanisms; the competency of the intermediate volcanic rock at the Vault deposit, and the wide spacing of these features suggests toppling is unlikely to develop. However, as mining continues, this area should be carefully monitored for the presence of any outward dipping features that could potentially act as a base plane for large block sliding. There is currently one prism installed in this area; additional prisms should be installed. At the time of the site visit this area of the wall was performing satisfactorily.



Photograph 8-12: Vault Pit east highwall nose and fault (2017)



Photograph 8-13: Vault Pit east highwall nose, fault, and widely spaced open joints

The following actions should continue to be implemented.

- Install additional prisms on the nose for on-going monitoring as the pit is deepened, where appropriate to do so.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.
- Pay particular attention and record any outward dipping features that could act as a base sliding plane.

8.4.3 Northeast and North Transition Walls

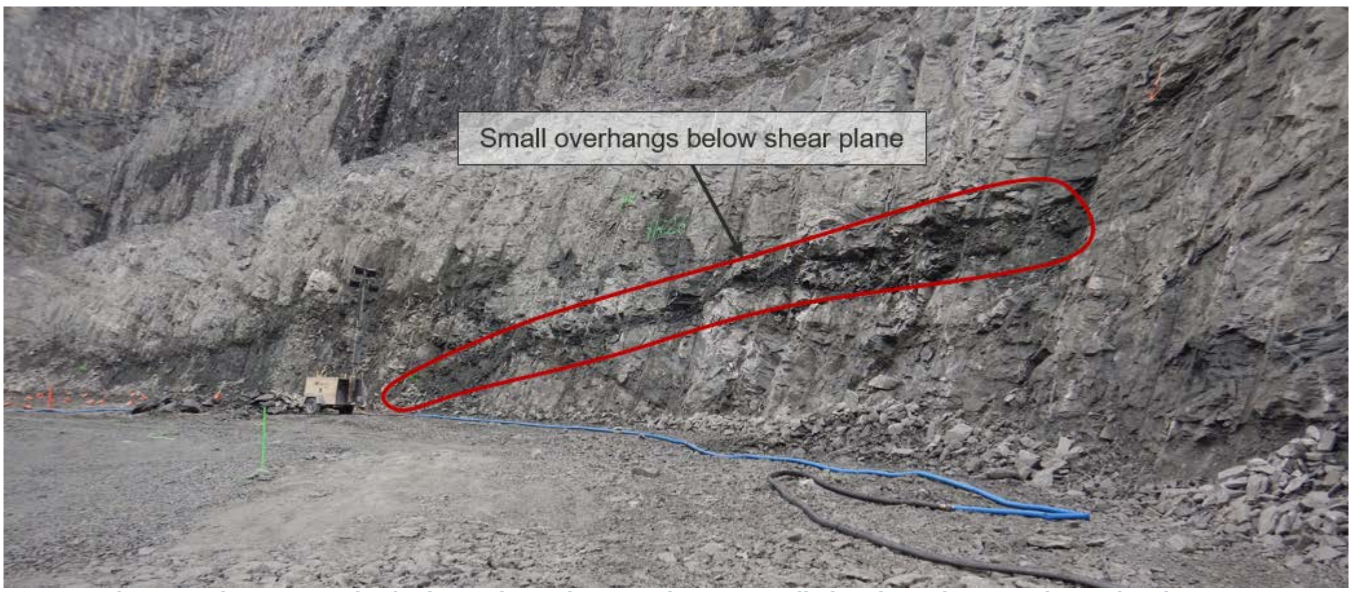
The benches of the northeast end of the highwall are performing adequately. The final bench faces show clearly visible half barrels of the pre-shear holes, and there is very little deviation. There is minor over break of bench crests from blasting. A small sump is excavated adjacent to the wall to manage water. The wall is generally dry, but with some minor localized areas of seepage from existing fractures.

Photograph 8-14: Vault Pit northeast wall bench performance (2017)

A series of shear planes, parallel to stratigraphy, are visible in the north transition wall. These are inclined towards grid east at the same orientation as the stratigraphy, at around 30 degrees. The shear planes intersect the lowermost bench of the grid east wall at the northeast end of the pit.

Photograph 8-15: Vault Pit east dipping shear planes in north wall, intersecting northeast wall (2017)

The intersection of the shear planes with the wall result in the potential for the development of overhangs if the rock is damaged during blasting, and bench faces are over excavated as a result. An example of the possibility of overhangs developing is shown in the following photograph.



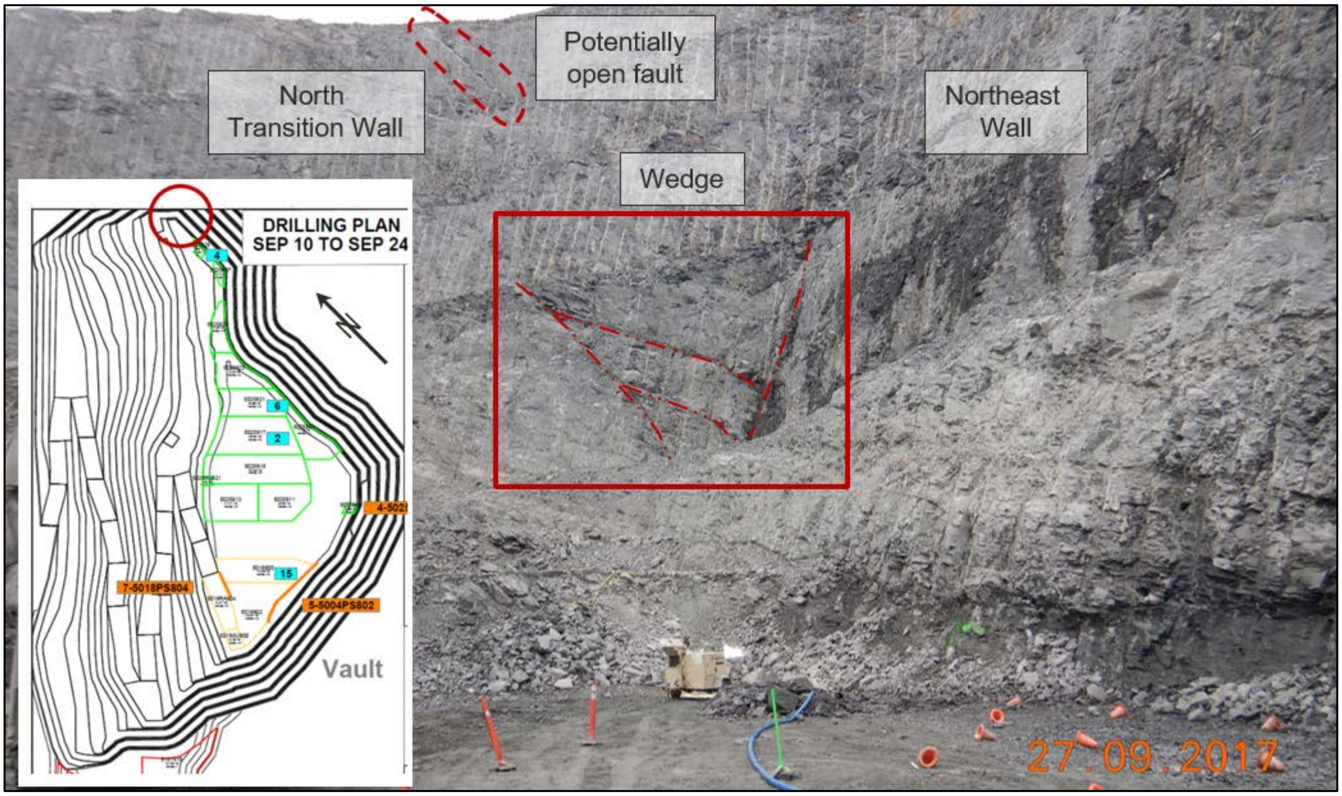
Photograph 8-16: Vault Pit shear planes intersecting east wall showing minor overhang development

The following actions are recommended:

- Continue to reinforce use of good pre-shear blasting practices to minimize wall damage.
- Continue to encourage good wall scaling practices and not over-excavating past dig lines.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

8.4.3.1 Northeast Wedge

A potential bench scale wedge was noted at the north end of the east wall, where it intersects the north wall at a right angle. While the west plane (south to southeast dipping) is clearly defined, it is difficult to confirm if a north-south trending release plane is present as this is coincident with the change in wall orientation. This was discussed with AEM during the site visit for continued visual monitoring, and to restrict access beneath this area of wall. Mining in this area of the pit is almost complete.



Photograph 8-17: Vault Pit wedge in northeast wall

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.
- Restrict access below the potential wedge, and install a bumper berm if adjacent to pit access road.

8.5 Vault Instrumentation

Following the 2016 field thermal exploration study, AEM selected three areas for instrumentation with piezometers and thermistors. The areas selected were areas where the thermal exploration study indicated talik conditions. The piezometers and thermistors are attached to data loggers, and the loggers are regularly downloaded and reviewed.

In addition to monitoring thermal and hydrogeological conditions in specific areas, AEM are installing prisms on final bench faces as the pit is deepened. The approximate locations for the instrumentation at the Vault Pit at the time of the site visit is shown in Figure 8-6. The available instrumentation data are presented in Appendix C.

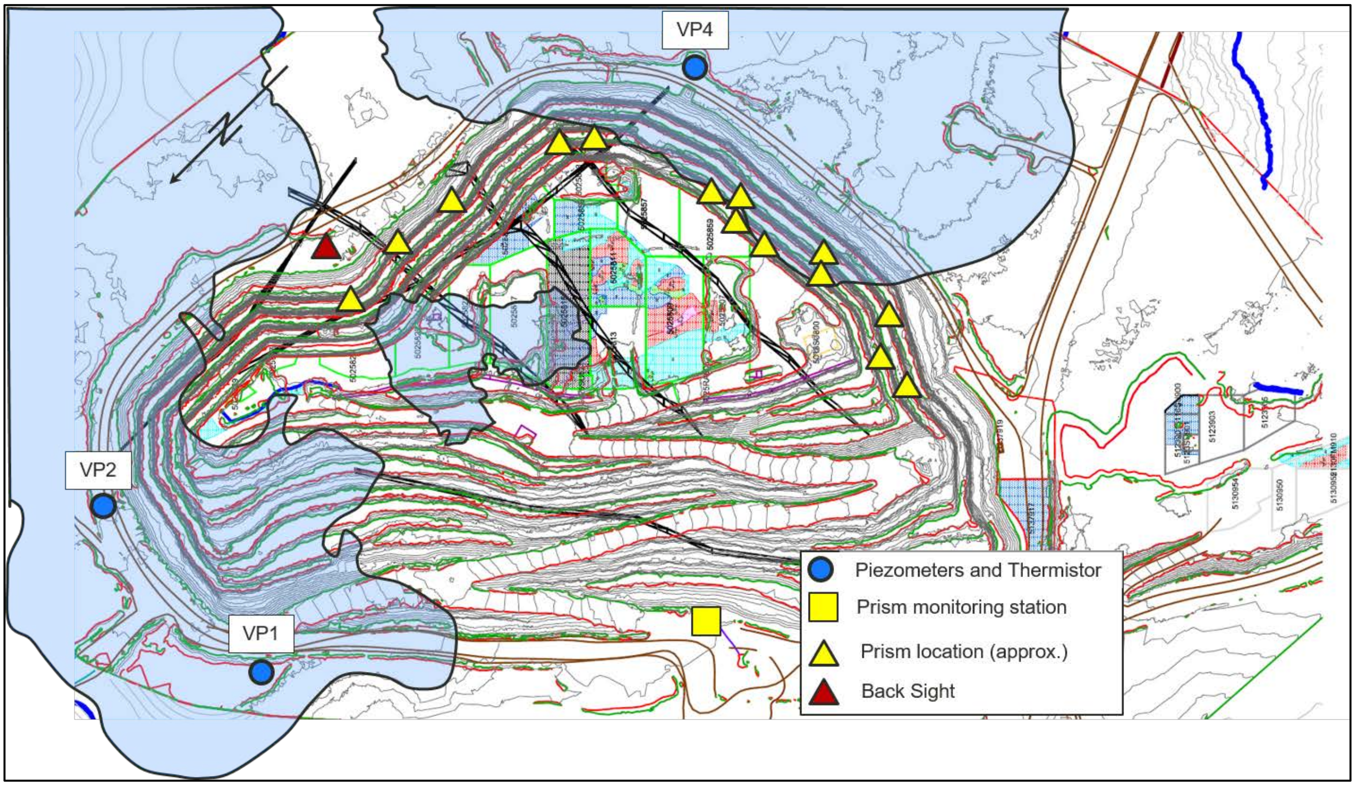


Figure 8-5: Vault Pit instrumentation plan

8.5.1 Thermistors

The thermistor cables are attached to data loggers, and the data reviewed regularly. VP1 and VP2 are installed in what formerly was a shallow drained bay of Vault Lake. VP1 is currently located adjacent to water management Pond C, and VP2 is adjacent to the north end of the pit. Since the former lake in this bay was shallow, the talik was not well developed. This is shown by both thermistors.

VP1 shows fluctuating ground temperatures, between 0 degrees C and -1 degree C. The location of the depth of zero annual amplitude is not well defined, nor is the active layer depth. This may be a function of the installation depth of the instrument.

VP2 shows a typical permafrost ‘trumpet’ curve. The temperature profile suggests equilibrium conditions are reached. Sub-zero temperatures are shown down to an elevation of approximately 5105 mRL. Between approximately 5105 mRL and 5090 mRL temperatures are at or marginally above 0 degrees C, before trending negative again. It is likely that over time permafrost will continue to aggrade and eventually this thermistor will full embedded in permafrost.

VP4 is installed behind the area of the ice wall. As with VP2, VP3 displays a typical permafrost ‘trumpet’ curve. The curve shows that the upper portion of the wall, to an elevation of approximately 5109 mRL, is within permafrost. Between 5109 mRL and 5090 mRL, temperatures are marginally above zero degrees C in the region that seepage is noted from the wall and where the winter ice wall takes form. The thermistor profile suggests that a cooling trend is underway, and that eventually the wall will freeze back fully.

8.5.2 Piezometers

The piezometer data from the three installations was reviewed. Since VP-1 and VP-2 are installed in ground temperatures marginally below 0 degrees C, the data from these may be unreliable, and this is suggested by the piezometric response curves which are erratic in areas. The thermistors embedded with the piezometers corroborate the negative ground temperature conditions. As is commonly seen, as temperatures decrease, pressures increase as a result.

The two deepest piezometers installed in VP-4 (VP-4C and VP-4B) were installed in talik. The shallowest piezometer (VP-4A) was installed in frozen ground. VP-4B shows ground temperatures relatively constant, at about 0.3 degrees C, and a pressure head of about 5110 mRL. VP-4C shows constant ground temperature following installation of about 0.8 degrees C, until approximately March 2017 after which it has dropped rapidly, crossing 0 degrees C in approximately May. At the time the ground temperature profile crosses 0 degrees C, the piezometric level begins to increase rapidly, suggesting the piezometer has frozen. The thermistor profile and piezometer data for VP4 suggest a cooling trend with the possibility the wall will freeze back fully.

8.5.3 Prisms

Prisms are being installed at the benches at Vault using a hydraulic man-lift. The prisms are currently surveyed at a frequency of once weekly unless unusual activity is noted. Once the data are collected they are reviewed. The data are analysed using GeoExplorer for change detection. There are currently no alarm trigger levels set up for the prism monitoring program. The prism data have only started to be collected recently, and there is insufficient data to determine any movement trends at this time. The data should be reviewed regularly.

8.6 Phaser and BB Phaser Pits

The Phaser Pit and BB Phaser pit are southward extensions of the existing Vault Pit. Initial stripping of Phaser Pit began in September 2017, with stripping at BB Phaser Pit pending. The slope design criteria proposed for the development of the Phaser and BB Phaser Pits are based on the current slope design criteria in use for the Vault Pit. Tetra Tech carried out a review of the proposed Phaser Pit and BB Phaser Pit development plan, and summarized their review in a brief report (Tetra Tech 2017) which is presented in Appendix D.

The general plan for the expansion of the two pits is shown in Figure 8-6.

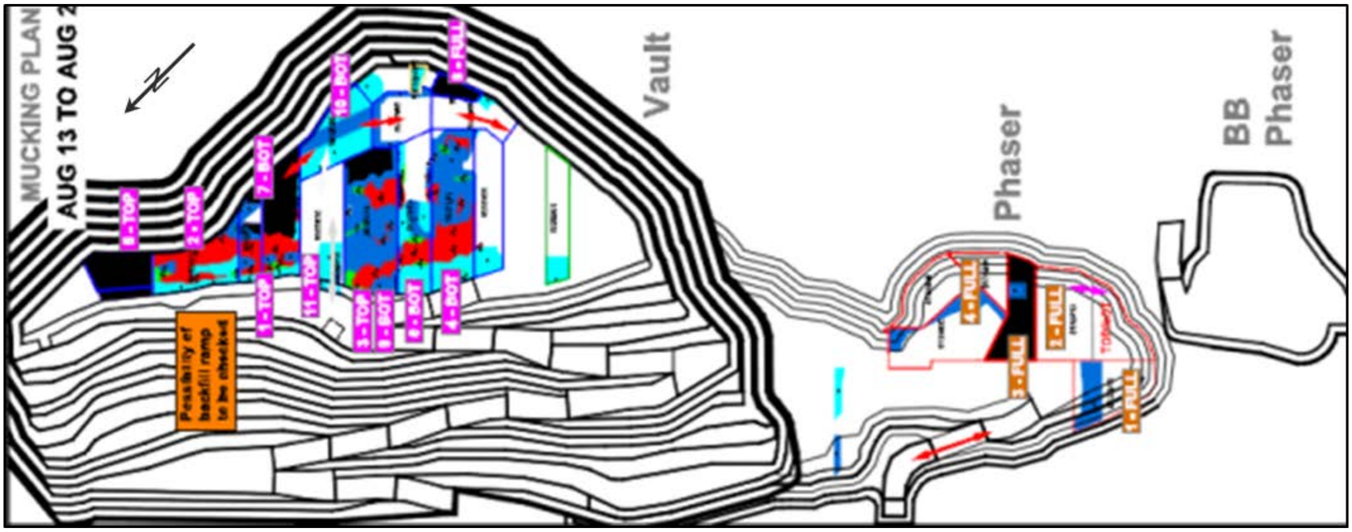


Figure 8-6: Pushback of Vault South Pit Wall to Phaser and BB Phaser Pits

The planned depth of the Phaser Pit will be in the range of 40 to 50 m (2 to 3 benches), not including the overburden at the crest of the pit which is estimated to be in the range of 20 to 25 m deep, based on cross sections provided by AEM. The west wall (footwall) of the pit will be in permafrost; a portion of the east wall of the pit may be within talik beneath the former Phaser Lake, which reached a maximum depth of about 3 m. Consequently, the talik beneath the lake is not expected to be significant, although some water inflow to the pit of talik water should be expected. It is anticipated this water will be managed using appropriately located sumps and pumps, as is done for the Vault Pit. The pit will be mined over a period of approximately 1 year, from Q3 2017 to Q3 2018. Ice build-up on the walls may occur during winter and may result in increased raveling.

BB Phaser Pit will be approximately 40 to 50 m south of the Phaser Pit. The pit will be excavated entirely within the lakeshore outline of the dewatered Phaser Lake. Based on available lake bathymetry the depth of Phaser Lake underlying BB Phaser Pit footprint is on the order of 1 to 2 m. Consequently, this portion of the lake will have frozen to lake bottom annually, and so the development of a deep talik beneath the lake is not expected. Nevertheless, some inflow to the pit of talik water should be expected. Ice build-up on the walls may occur during winter and may result in increased raveling. It is anticipated this water will be managed using appropriately located sumps and pumps, as is done for the Vault Pit. The planned depth of mining of the BB Phaser Pit will be in the range of 30 to 40 m, not including overburden at the crest of the pit which may be up to 25 to 30 m deep, based on cross sections provided by AEM. The pit will be mined over a period of approximately 1 year, from Q1 2018 to Q1 2019.

At the time of the site visit there was very little rock exposure to be seen; stripping of the overburden materials was in progress, and some initial blasting had been completed. Approximately 5 to 7 m of overburden, frost shattered and blast damaged bedrock visible.

Photograph 8-18: Phaser Pit stripping (September 2017)

Although rock exposure was limited, and damaged by blasting and near surface weathering, the general orientation of the stratigraphy could be seen inclined to the east at a shallow angle, similar to the main Vault deposit stratigraphy.

The following actions are recommended:

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.
- Continue mapping to confirm the orientation of stratigraphy and other important structures.

Photograph 8-19: Phaser Pit east dipping stratigraphy (2017)

9.0 SUMMARY OF KEY OBSERVATIONS AND RECOMMENDATIONS

9.1 Portage Pit

The Portage Pit is subdivided into 5 pits, labelled A through E from north to south.

9.1.1 Pit A

During the site visit, mining was finishing at the north end of Pit A, with plans to complete mining of the pit in Q1 2018 along the west side.

The upper benches of the north through northeast, and east wall are performing satisfactorily.

A wedge failure approximately 179 t failed on the lowest bench at the north end of the east wall at the transition to the north wall. Additional wedges of similar size were noted along this bench. These were scaled out as the pit was mined down.

The upper west wall has not experienced any additional failures following the September 2016 event which occurred in ultramafic rock in contact with overlying quartzite. A contributing factors to the failure is the presence of a steeply west dipping fault structures behind the bench face, and the poor quality and sheared ultramafic rock. A significant tension crack exists along the crest behind the wall. In 2017 AEM requested a specialist contractor (Vertika) to attempt to dislodge this block of rock. Despite the application of up to 30 tons pressure, there was no movement or destabilization of the block. The area should continue to be monitored.

The lower benches of the west wall were noted to be performing well. However, an area for observation was identified. A steeply inclined plane oblique to the wall was noted, and could result in on-going ravelinig and rock falls. A potentially de-coupled block was also identified for continued observation.

- Mark the tension crack on the west wall crest on a geohazard plan.
- Install a wireline extensometer to monitor of the tension crack in the crest area of the west wall.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.
- Minimize exposure time at the toe of the west slope.
- Make operators aware of the risk for wedge instability along the east wall.
- Minimize access along the lower benches of the east and west walls until mining is completed
- Maintain a safe working distance in accordance with the internal AEM safe work procedure for work close to pit walls.

9.1.2 Pit B (B Dump)

The Pit B (B Dump) geometry remains essentially unchanged from the 2016 site inspection. The segments of the east and west rock walls that are still exposed are performing well, and there are no significant geotechnical concerns. Benches are generally clean and free of any material accumulation.

The B Dump is performing well. There are no tension cracks observed on the crest platform, and no observed signs of deformation of the dump toe or dump face.

- Continue to monitor as part of regular geotechnical inspections.

9.1.3 Pits C and D (C and D Dumps)

The west and east pit walls of Pits C and D are buttressed by the C and D Dump. There has been no substantive change in the geometry of C Dump since the 2016 site inspection.

D Dump continues to be active, with dumping from the crest elevation. Some settlement of the D Dump crest, and associated tension cracks, that were deserved in 2016 at the eastern margin of the platform where it abuts the adjust rock benches were observed again in 2017 with no apparent change. No signs of deformation of the dump face were observed, nor were tension cracks noted.

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

9.1.4 Pit E East Wall

The east wall of Pit E continues to perform well, and there is little year-to-year accumulation of material on the benches. There are no significant geotechnical concerns for this wall.

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.
- Continue to scale and clean final benches.

9.1.5 Pit E South Wall

Pit E south wall exposes primarily ultramafic rock, with iron formation and volcanic rock on its eastern edge. The ultramafic rock is poor quality. During the summer months of 2015 the wall experienced considerable instability, resulting in several single and multi-bench failures within the ultramafic rock exposed in the south wall. This led to cessation of mining activities at the toe of the failed area of slope.

An alternative mining plan for the wall was developed by AEM which involved the pushback of the Pit E5 south wall into more favourably oriented stratigraphy, and less structural complexity. A geotechnical field investigation and subsequent office study was completed based on the new geotechnical data, and involved limit equilibrium modeling and finite element modeling. The results of the study indicated overall slope stability for the proposed pushback, and minimal horizontal displacements beneath the Bay Goose Dike. The study recommended the installation of specific instrumentation behind the wall, including time domain reflectometry cables, piezometers, thermistors, a slope inclinometer, and prisms. With the exception of prisms AEM have installed and are monitoring the recommended instruments.

AEM are currently mining the pushback of the Pit E5 south wall A review of the available TDR data show no indication of shear plane development in the slope. Several of the piezometers installed behind the crest show a response to drilling and blasting at the toe, which is consistent with the conceptual hydrogeological and engineering geological model understanding. In addition to the instrumentation, the slope is continually monitored using a GroundProbe radar.

Several rock fall events occurred in June and July along the south wall ramp. These were slab type failures along foliation. AEM have been mapping the ramp as it is advanced, using a LiDAR scanner.

There are two specific areas of the south ramp that require ongoing monitoring. The first is a potential wedge (south ramp wedge) formed below the ramp at the entry of point of the ramp to the south end of the pit from the west crest. There is loss of bench crest below the rap, and the accumulation of material on the platform below. This area should be closely monitored during regular geotechnical inspections, including inspection for tension cracks on the outside edge of the ramp. This area should also be added to the radar monitoring.

The second area is at the eastern end of the ramp, at the switchback, where a number of outward dipping planes (southeast wall planes) are noted. Since these are directly adjacent to the ramp, this area should also be closely monitored during regular geotechnical inspections, and the area should be included in radar monitoring. Safe set back distances from the wall should be respected, and a bumper berm indicating no entry should be considered.

- Include the south ramp wedge and southeast wall planes in radar monitoring, and as specific areas in regular geotechnical inspections.
- Inspect haul road above south ramp wedge area for tension cracks.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

9.1.6 Pit E West Wall

Currently the performance of the west wall benches is generally satisfactory, particularly in the upper benches excavated in the stronger rock types, although some crest loss is noted. The bench face angles are steep, with wide catch benches, and these are adequate for retaining the material that has failed. At the south end of the west wall, the contact of the ultramafic rock and overlying intermediate volcanic rock is inclined into the wall, which is beneficial for overall slope stability, but results in bench-scale instability of the underlying ultramafic rock. The Bay Fault trends along the base of the wall, parallel to the wall.

Mining down of the pushback area has resulted in material being dozed over the edge of the west wall, filling benches and the south wall slot. Since the pit base is currently closed this is hazard has low risk associated with it.

- Continue to restrict access immediately below the slope.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

9.1.7 Pit E West Wall Ramp

The west ramp is currently deactivated, but maintained. It will be reactivated in 2019.

Seven areas of potential instability observed immediately adjacent to the West Wall Ramp continue to be monitored. No indications of instability since the 2016 inspection were noted. The rock fall containment berm constructed along the west edge of the ramp continues to provide adequate catchment for rock falls that might occur along the west wall above the ramp. As the ramp descends south along the west wall into the base of Pit E, it becomes single lane to accommodate the width of the containment berm adjacent to the bench. A buttress constructed down slope of the ramp provides additional support to the ramp.

- Widen ramp in this area to allow haul maintenance in the event of a failure.
- Construct a rock fall protection berm along the bench toe of this section.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

9.1.8 Pit E Pushback South and East Wall

The slot mined at the south end of Pit E has been partially filled with waste rock pushed over the edge of the pushback area as it is being mined down. The slot area is currently closed. Consequently, the hazards associated with potential bench scale instability within the lower portions of the wall have a low associated risk.

- Continue careful scaling and bench cleaning as the pushback is deepened.
- Do not undercut foliation with bench face angles.
- Instruct operators not to over-excavate.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections

9.1.9 Pit E Instrumentation

The TDR, thermistor, piezometer and inclinometer data from instrumentation installed behind the south wall of Pit E in 2017 were reviewed. The instrumentation is connected to an Automated Data Acquisition System. The TDR cables show no displacement. The two thermistors confirm the presence of a talik behind the wall. Nested piezometers were installed in 5 locations.

A review of the piezometer data showed a response in one piezometer to drilling of a blast pattern at the toe of the slope and characterized by a 50 m drop in pressure head with a relatively rapid recovery. Three nearby piezometer nests did not respond in the same way; however, the three did respond to the subsequent blast with a rapid increase in pressure head of 1 to 2 metres. A similar response was recorded during the summer, however this was not investigated in detail.

Some of the piezometers appear to be on an upward trend, and so the instrumentation data should be reviewed more frequently and in greater detail to understand if this trend is real. AEM should carry out a detailed review of the instrumentation in consideration of both the hydrogeological and engineering geological models to investigate further.

One inclinometer was installed in a dedicated borehole behind the wall. AEM noted that the data are questionable after May 1 2017, as a result of a malfunctioning thermistor at Sensor 16. AEM have requested input from the manufacturer on how best to resolve the unreliable data.

- Carry out a detailed review of the instrumentation data in the context of the hydrogeological and engineering geological model.
- Review the piezometer data more frequently and in greater detail to investigate an apparent upward trend to determine if the trend is real.

9.2 Goose Pit

The walls of the Goose Pit continue to perform well. There are no significant concerns noted with the performance of the Goose Pit rock walls. The TDR, thermistor, and piezometer data collected from instrumentation installed behind the east wall of the Goose Pit were reviewed. There are no noticeable changes to the data and the data show no indications of slope instability. AEM have reported that the TDR100 data logger used at Goose Pit has been moved to replace the broken TDR100 data logger at Portage Pit. The broken data logger is currently being repaired. AEM have also added functionality to the instrumentation system through the addition of GeoExplorer software for easier access and visualization of data.

End dumping of waste rock to the northwest corner of the pit near the access ramp entry point (North Dump) was carried out in 2016, stopping in June of that year. Dumping recommenced in 2017 creating a second but contiguous dump south of the first (South Dump). Tension cracks have been observed in the crest area of both the North and South Dumps. AEM established a wireline extensometer across the tension cracks of the South Dump, and set trigger levels for appropriate response to indications of movement.

- If the Goose Pit dumps are to be reactivated, carry out a dump inspection and develop an action plan for inspections and monitoring.
- Limit access to the dump crest.
- Mark the position and extents of the existing tension cracks on a dump plan for on-going monitoring purposes.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

9.2.1 Goose Pit instrumentation

The TDR, thermistor, and piezometer data collected from instrumentation installed behind the east wall of the Goose Pit were reviewed. AEM indicate that the TDR100 data logger used at Goose Pit has been moved to replace the broken TDR100 data logger at Portage Pit. The broken data logger is currently being repaired. AEM have added functionality to the instrumentation system through the addition of GeoExplorer software for easier access and visualization of data.

The TDR data remain unchanged from previous years. The thermistor data is generally consistent with previous years, although GPIT-14 shows a slight cooling trend. Some of the piezometer data are unreliable as the tips may be frozen. The unfrozen piezometers continue to provide useful data.

9.3 Vault Pit

Mining of the Vault Pit continues to advance rapidly. At the time of the site visit, the pit had been excavated to 5025 mRL. The pit walls of the Vault Pit continue to perform well, and as expected. Following the 2016 field thermal exploration study, AEM selected three areas for instrumentation with piezometers and thermistors. The areas selected were areas where the thermal exploration study indicated talik conditions. The piezometers and thermistors are attached to data loggers, and the loggers are regularly downloaded and reviewed. In addition to monitoring thermal and hydrogeological conditions in specific areas, AEM are installing prisms on final bench faces as the pit is deepened.

9.3.1 Footwall (Vault Grid West Wall)

The west wall is being mined on single benches and parallel to the dip of the stratigraphy. The wall is being mined as a series of single benches (7m high) to create a footwall slope. The slope follows the inclination of the ore which is inclined to the east, parallel with foliation and stratigraphy. There are areas of notable bench crest and catchment loss, as expected in the design of this wall. The design criteria for the wall was specified as single bench to accommodate the expected loss of some benches, and minimize the volume of failed material. There are no significant geotechnical concerns noted, and no evidence of large scale (overall slope) instability for the footwall slope.

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

9.3.2 Southwest Wall (Vault Grid South Wall)

The stratigraphy intersects the south wall at right angles. A small sump is in the southwest corner of the pit and manages water in this area. Two outward dipping planes were noted above the sump area, forming shallow slivers of potentially unstable rock. The planes strike slightly obliquely to the wall orientation, and while they are kinematically free on their north extension, they do not appear to have any additional side release planes required for failure to occur. Nevertheless, it is possible with annual cyclic freeze-thaw that these could become destabilized and ravel. Since these features are directly above the sump area and associated equipment, and the area is regularly visited by personnel, these should be identified on a geohazard map for the pit and their presence communicated to anyone visiting the sump area.

- Communicate the hazards in the sump area to personnel and remain on the pit-side of the equipment container for safety.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

9.3.3 Southeast to Northeast Highwall (Vault Grid East Wall)

The southeast to northeast highwall (grid east) is being mined down from the final crest position. The wall is performing satisfactorily.

The final wall benches are being mined using pre-shear blasting methods, and are being excavated to 75-degree bench face angles. Half barrels from the blast holes are clearly visible in the walls and there is very little deviation of the borehole traces. The benches are cleaned well, and there is no indication of significant raveling and no significant accumulation of material on the benches.

An area of seepage on the southeast wall of the pit emanates from just above the 5109 mRL bench. The seepage results in the formation of a substantial ice wall during winter which presents operational challenges to the mining schedule. During the 2017 site inspection water could be seen flowing down the southeast wall from an area just above the 5109 mRL bench, and a significant portion of the wall was stained with iron oxide. Instrumentation installed behind the wall indicate the wall is freezing back, but has not completely frozen.

The water inflows to the pit from the southeast wall have been most problematic during winter, when a large ice wall is formed. AEM have investigated the ice wall further, contracting an external consultant (Vertika) to provide advice on possible management options (Vertika, 2017). AEM have taken proactive steps to implement an ice monitoring program, including recording of ice wall conditions according to instruction by Vertika. A review of thermistor data suggests that freeze back of the wall is occurring however at this time flow is still active and ice is accumulating on the wall.

- Continue to monitor the piezometer and thermistor data from VP4 to build an understanding of the rate at which freeze back is occurring.
- Continue to manage the level of Pond D as low as possible to reduce the groundwater levels in the bedrock behind the seepage area.
- Continue visual monitoring of the inflows on the pit wall as part of regular site geotechnical inspections.
- Continue to include standard ice wall inspection procedures and protocols as implemented by Vertika.
- Monitor potential local raveling of material from the wall during spring freshet. Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

9.3.4 Highwall Nose Area

A minor change in wall orientation results in the formation of a 'nose' in the highwall near the northeast end of the wall. This sector of the wall has been developed within permafrost, and there are no apparent seepage faces on the wall.

A series of widely spaced faults and open continuous joints dip into the nose area at steep angles. The orientation of these structures could conceivably result in the development of toppling type failure mechanisms; the competency of the intermediate volcanic rock at the Vault deposit, and the wide spacing of these features suggests toppling is unlikely to develop. There is currently one prism installed in this area; additional prisms should be installed.

- Install additional prisms on the nose for on-going monitoring as the pit is deepened.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.
- Pay particular attention noting to any outward dipping features that could act as a base sliding plane.

9.3.5 Vault Northeast and North Transition Walls

A series of shear planes, parallel to stratigraphy, are visible in the north transition wall. The shear planes intersect the lowermost bench of the grid east wall at the northeast end of the pit. The intersection of the shear planes with the wall result in the potential for the development of small overhangs where rock blocks are separated from the top release planes formed by these shears. This is exacerbated by poor blasting methods, over-excavation, and plucking of the rock.

- Continue to encourage use of good pre-shear blasting practices to minimize wall damage.
- Continue to encourage good wall scaling practices and not over-excavating past dig lines.
- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.

9.3.6 Vault Northeast Wedge

A potential bench scale wedge was noted at the north end of the east wall, where it intersects the north wall at a right angle. This was discussed with AEM during the site visit for continued visual monitoring, and limited access beneath this area of wall. Mining in this area of the pit is almost complete.

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.
- Limit access below the potential wedge, and install a bumper berm if adjacent to pit access road.

9.4 Phaser and BB Phaser Pits

Initial stripping of Phaser Pit began in September 2017, with stripping at BB Phaser Pit pending. The slope design criteria proposed for the development of the Phaser and BB Phaser Pits are based on the current slope design criteria in use for the Vault Pit. At the time of the site visit there was very little rock exposure to be seen; stripping of the overburden materials was in progress, and some initial blasting had been completed. Although rock exposure was limited, and damaged by blasting and near surface weathering, the general orientation of the stratigraphy could be seen inclined to the east at a shallow angle, similar to the main Vault deposit stratigraphy.

- Continue visual monitoring and recording of observations as part of regular site geotechnical inspections.
- Continue mapping to confirm the orientation of stratigraphy and other important structures.

9.5 Ground Control Management Plan

AEM have developed a comprehensive Ground Control Management Plan (GCMP) for the site, which is thorough and detailed in its scope, and practical in its implementation. The GCMP was reviewed as part of the site visit, and provides information relating to the engineering geological and geotechnical model for the Meadowbank Mine, including hydrogeological and permafrost conditions. It presents the design basis and discusses slope instability mechanisms. Hazard identification and the risk assessment process is discussed, leading in to how geotechnical hazards are monitored and managed on site. The roles and responsibilities of key personnel are presented for clear communication, and safe work practices are discussed. The GCMP provides for regular auditing and review of geotechnical aspects relating to operation of the pits, and of other infrastructure. Key Mine Act Regulations are included for information, and important safe work procedures and Trigger Action Response Plans are presented.

9.6 Rock Fall Database

A rock fall database is maintained at the site, and records rock fall events. The location, time and date and coordinates, rock type, estimated tonnage, whether the event was reported to the Mines Inspector, and whether the event was predicted by the radar system are recorded. The database was reviewed and is up to date.

9.7 Ice Monitoring Plan (Vertika, Inc.)

In 2017 AEM requested Vertika Inc, to carry out an inspection of the ice wall in Vault Pit, and to assist in developing an ice wall inspection program for implementation during regular geotechnical inspections. A simple one-page form was developed for carrying out ice inspections, and the ice inspection program provides some direction on characterizing and classifying ice.

9.8 Geotechnical Mapping and Surveying

Geotechnical and structural information should continue to be collected form all operational pits. This is most efficiently and safely accomplished using the Lidar scanner coupled with processing using MapTek software. Any areas that may potentially pose risk of instability should be surveyed, and assessed.

Areas of seepage in the pits should be surveyed and compiled into the overall site geotechnical management plan.

10.0 CLOSURE

The reader is referred to the Study Limitations which precede the text and forms an integral part of this report.

We trust this report meets your requirements. Should you have any questions or concerns, please do not hesitate to contact the undersigned.

Yours truly,
Tetra Tech Canada Inc.

REGISTERED PROFESSIONAL ENGINEER
C. J. CLAYTON
LICENSEE
NT/NU

22 Dec 2017

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PERMIT TO PRACTICE
TETRA TECH CANADA INC.
Signature
Date Dec 22, 2017
PERMIT NUMBER: P 018
NT/NU Association of Professional Engineers and Geoscientists

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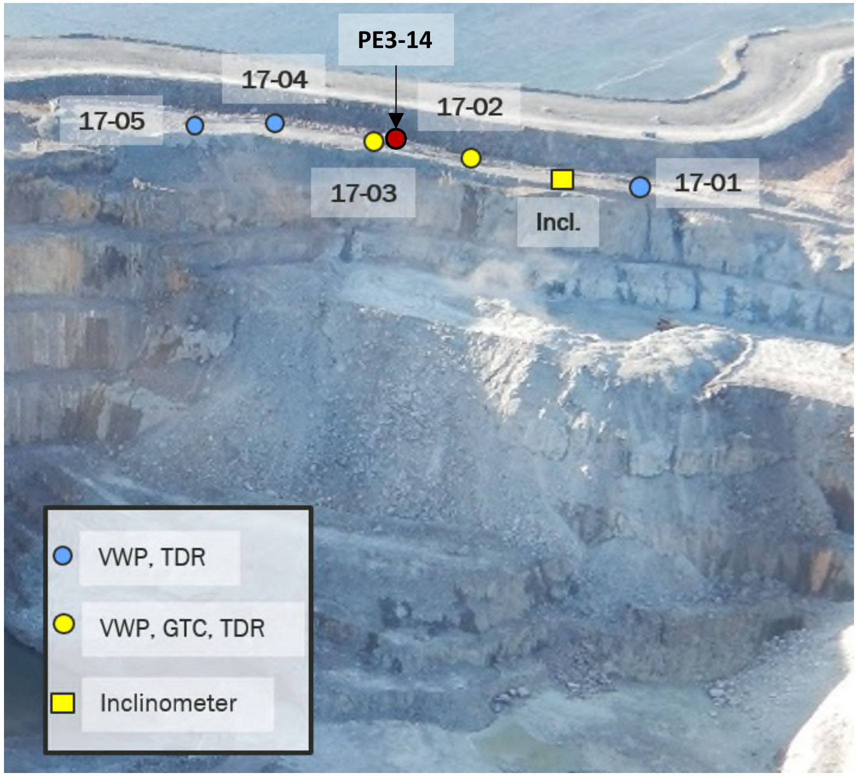
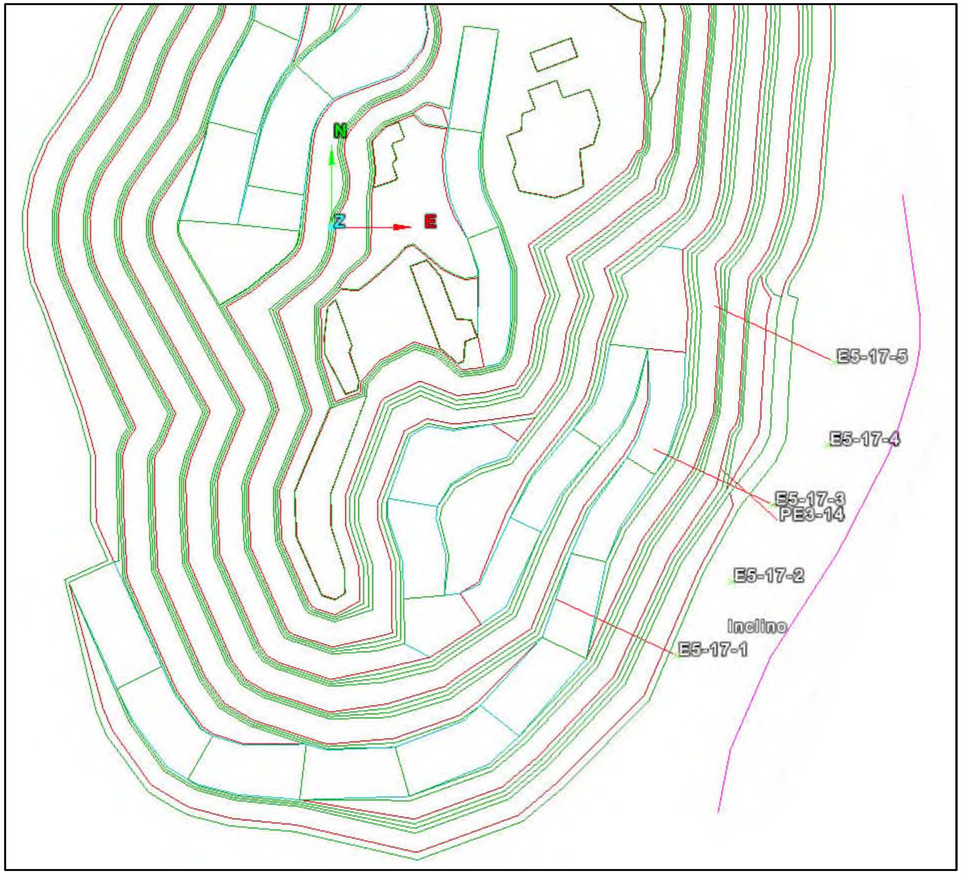
APPENDIX A

PORTAGE PIT INSTRUMENTATION DATA





LEGEND

VWP – Vibrating Wire Piezometer
TDR – Time Domain Reflectometry
GTC – Ground Temperature Cable (Thermistor)

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

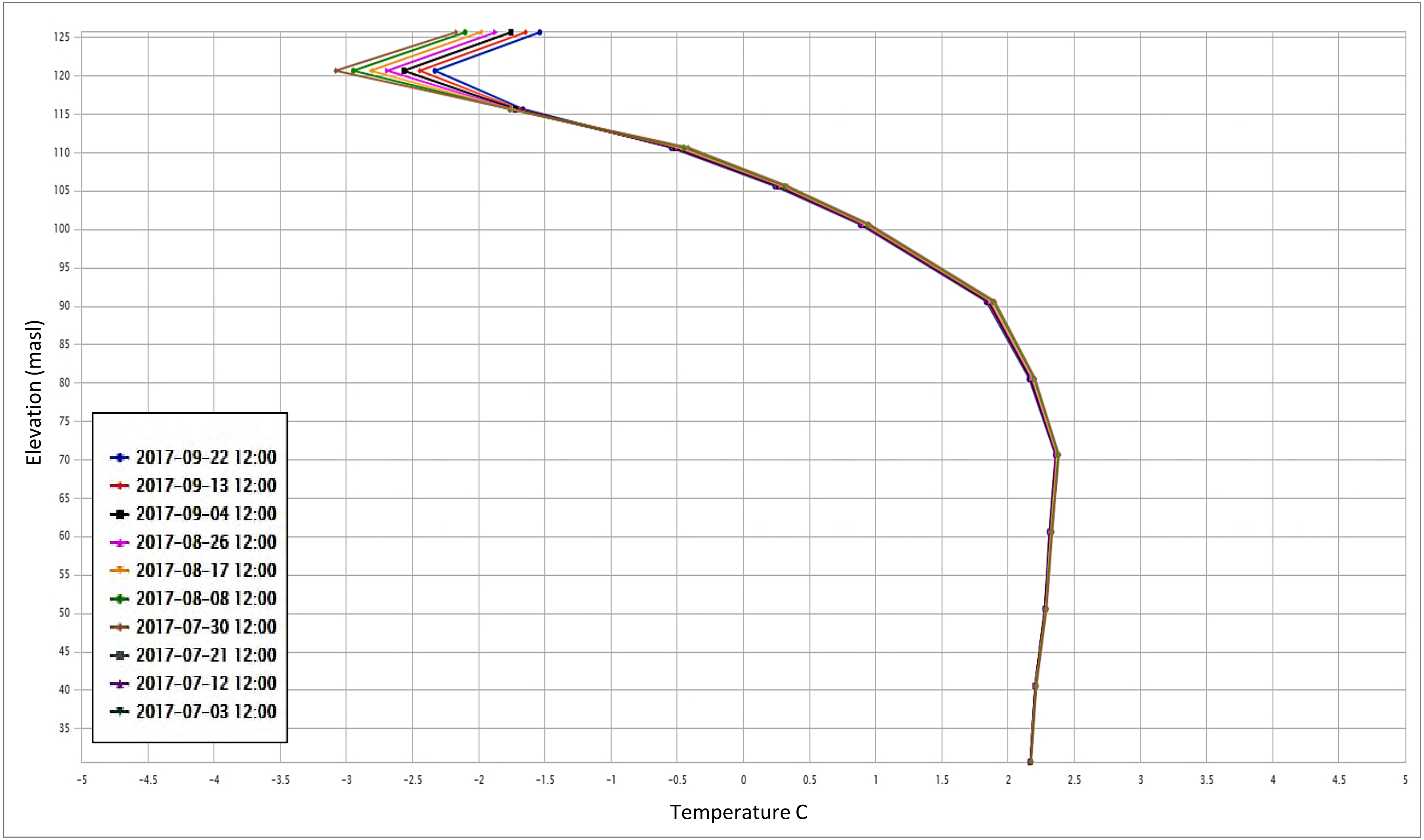
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit E5 Instrumentation Location

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure A-1



LEGEND

Vertical installation

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

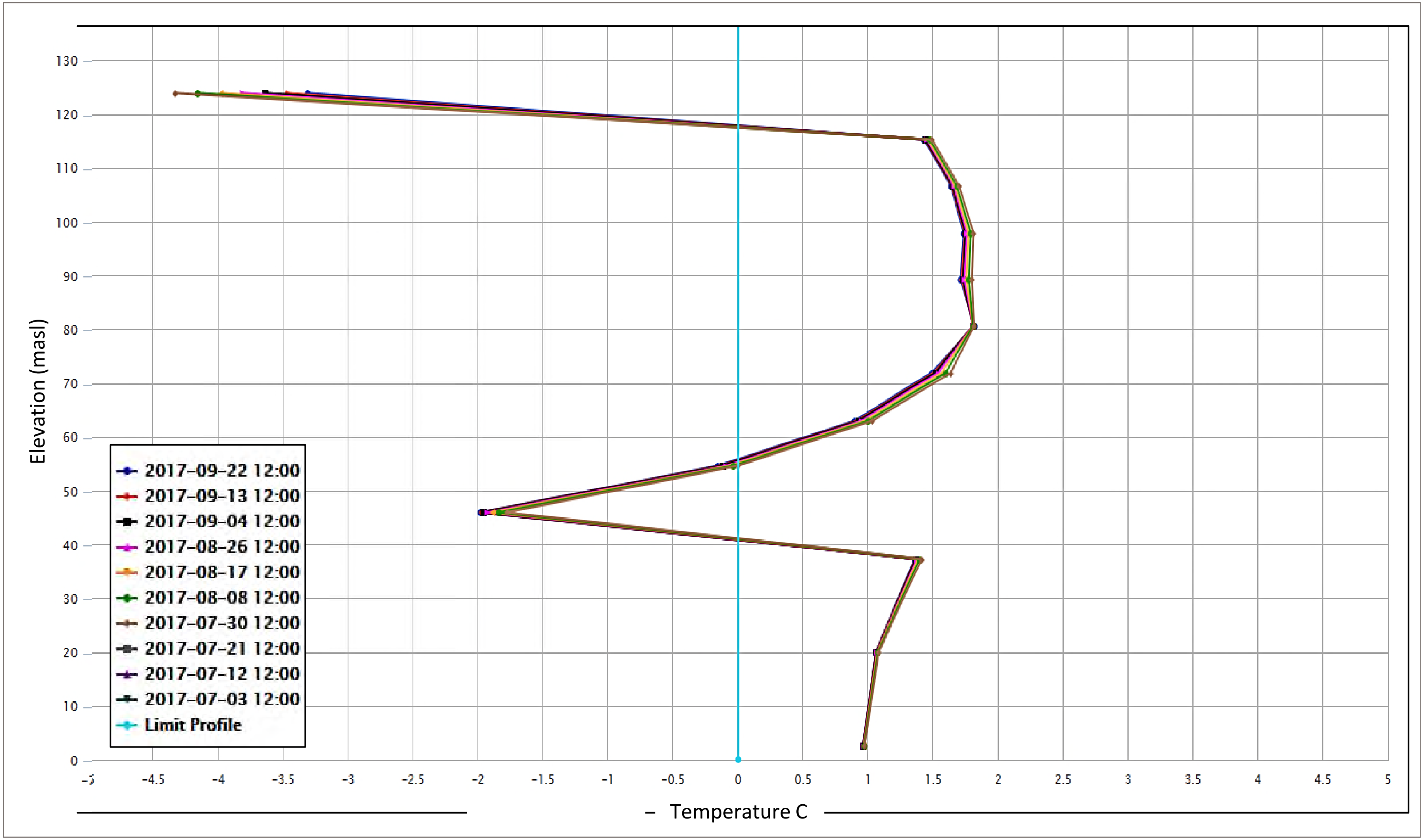
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit E5 Thermistor Cable PE5-17-02 TH

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCKC03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure A-2



LEGEND

Inclined installation

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

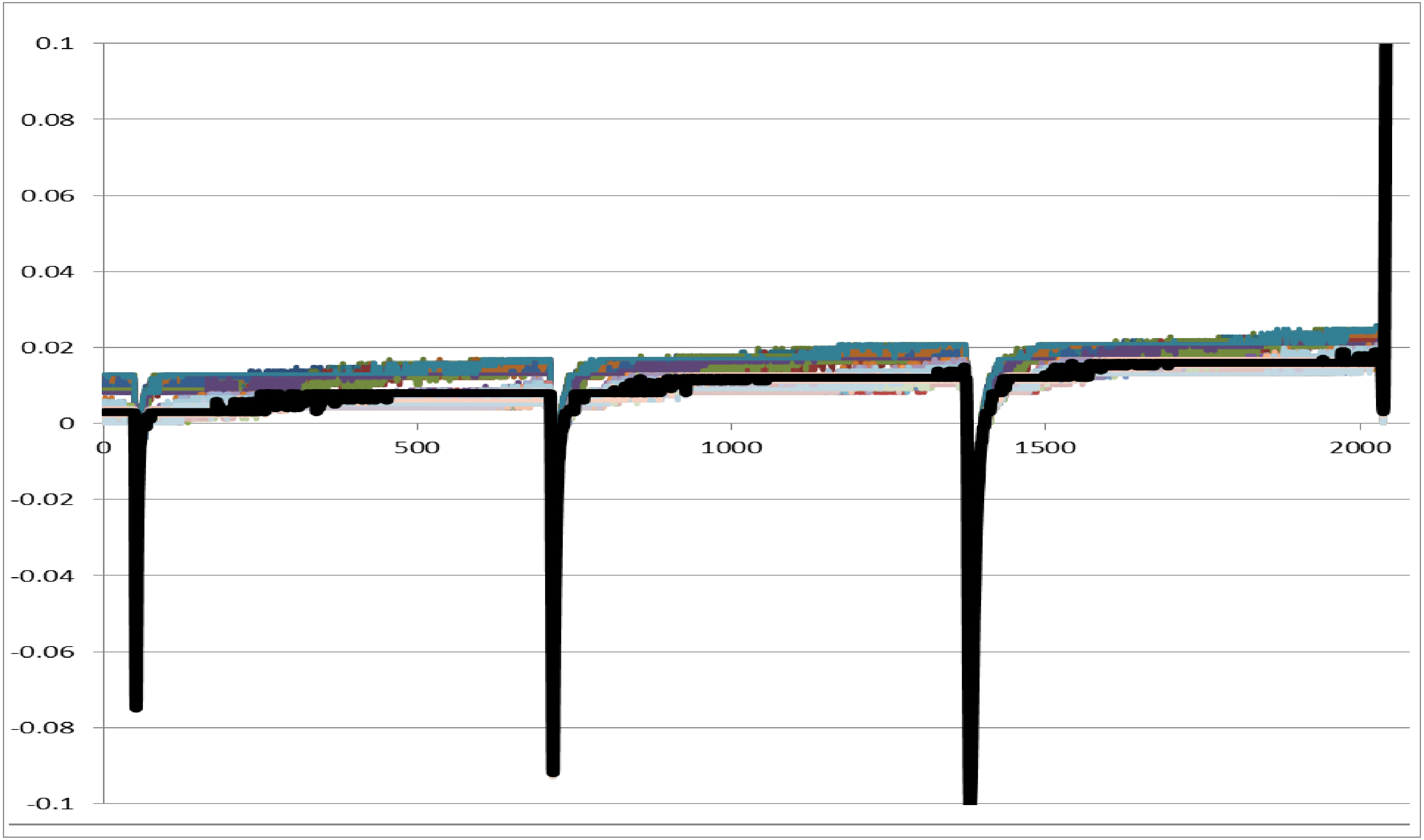
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit E5 Thermistor Cable PE5-17-03 TH

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure A-3



LEGEND

DATE RANGE: JUNE 2017 TO OCTOBER 2017

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

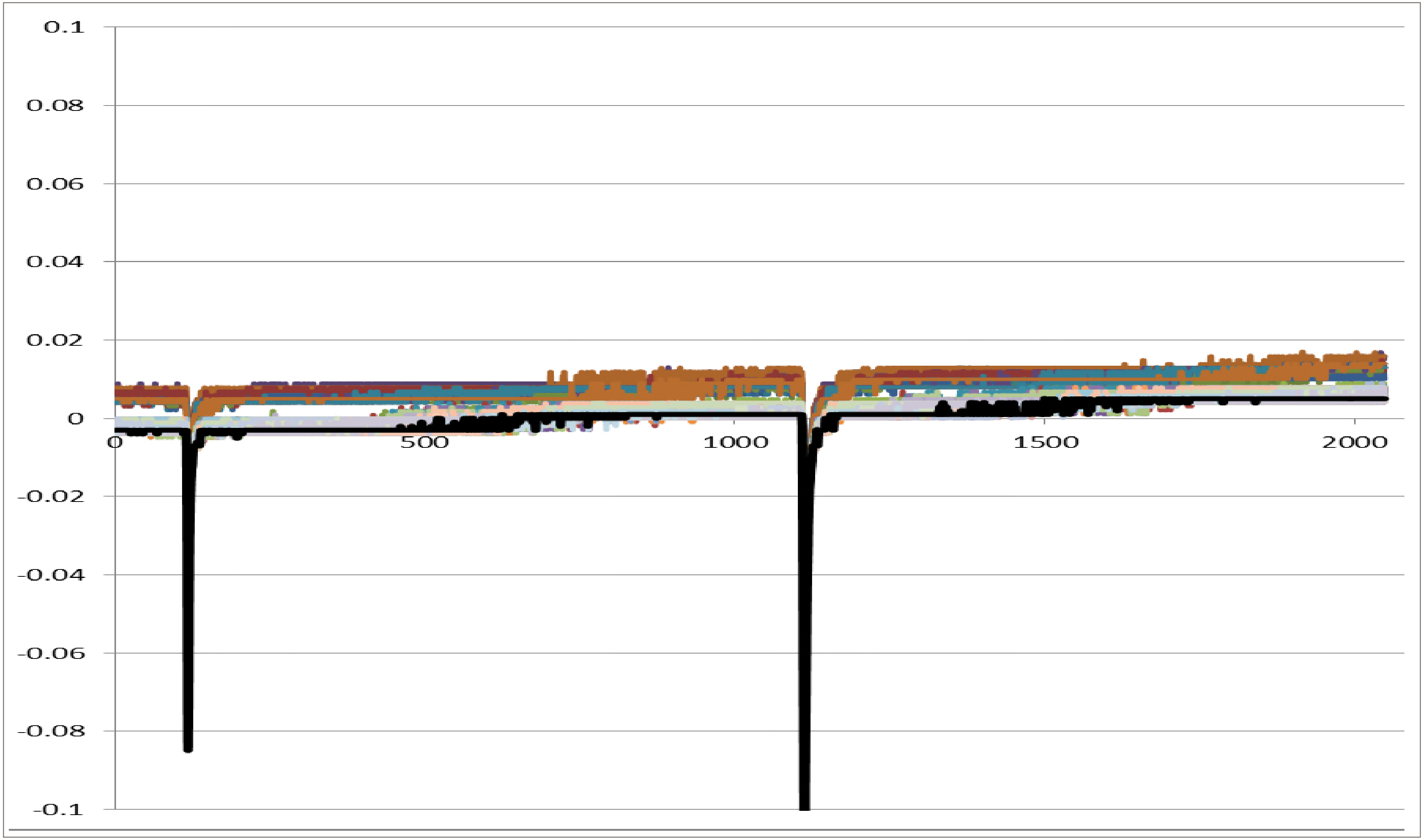
MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Portage Pit E5
TDR Data TDR-01

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure A-4



LEGEND

DATE RANGE: JUNE 2017 TO OCTOBER 2017

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

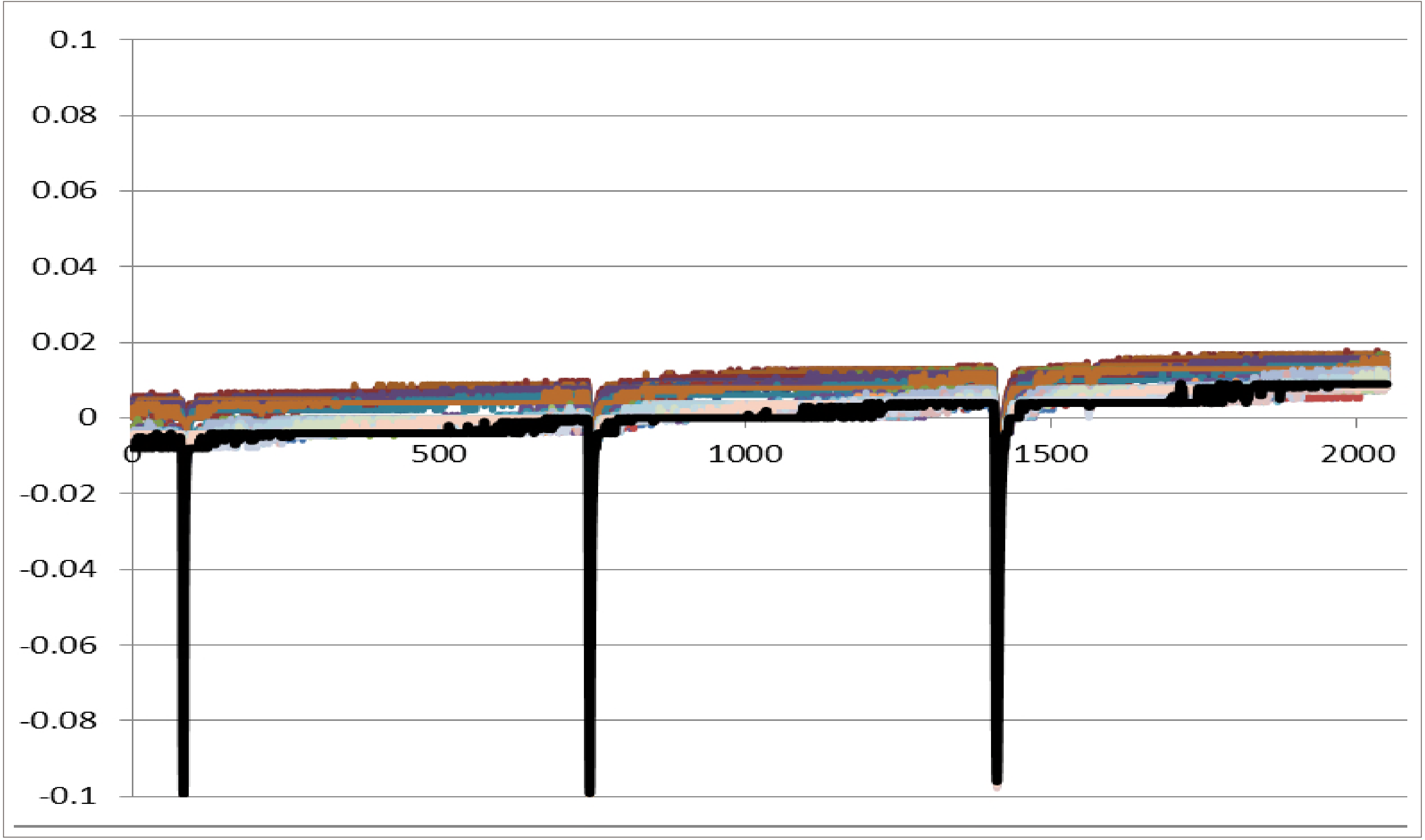
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit Hole E5-17-2 TDR Data TDR-02

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure A-5



LEGEND

DATE RANGE: JUNE 2017 TO OCTOBER 2017

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

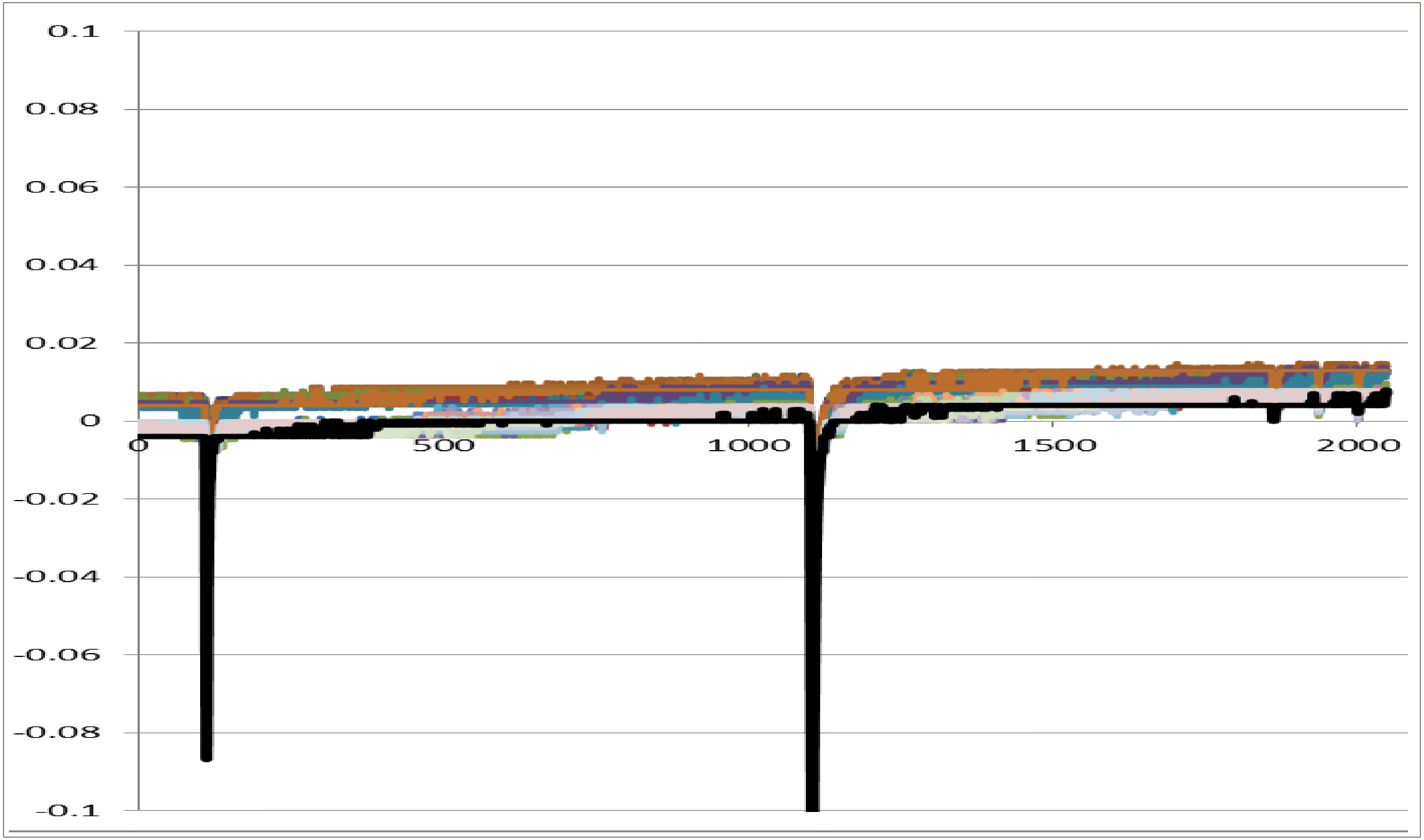
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit E5
TDR Data TDR-03

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure A-6



LEGEND

DATE RANGE: JUNE 2017 TO OCTOBER 2017

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

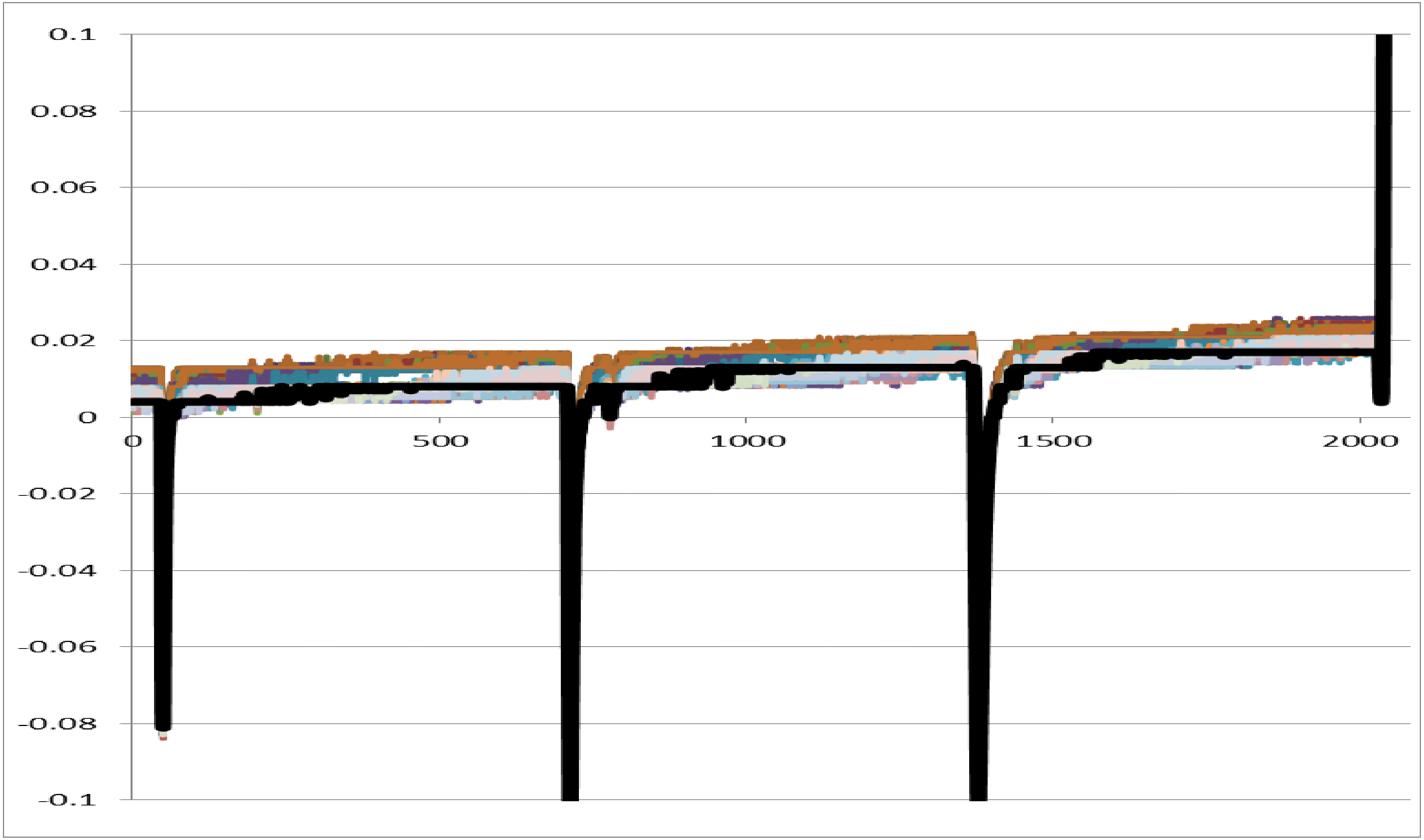
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit E5 TDR Data TDR-04

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure A-7



LEGEND

DATE RANGE: JUNE 2017 TO OCTOBER 2017

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

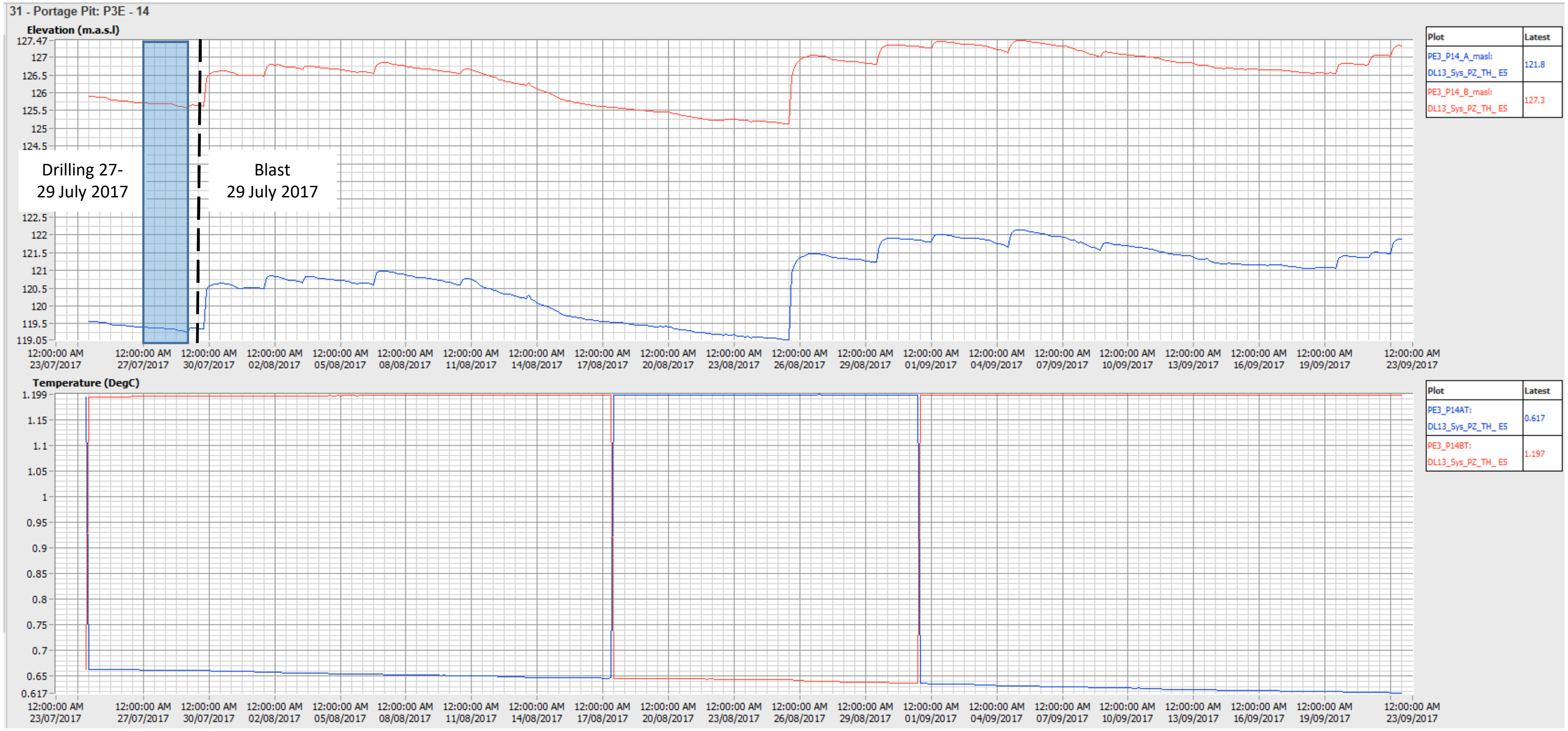
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit TDR Data TDR-05

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure A-8



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

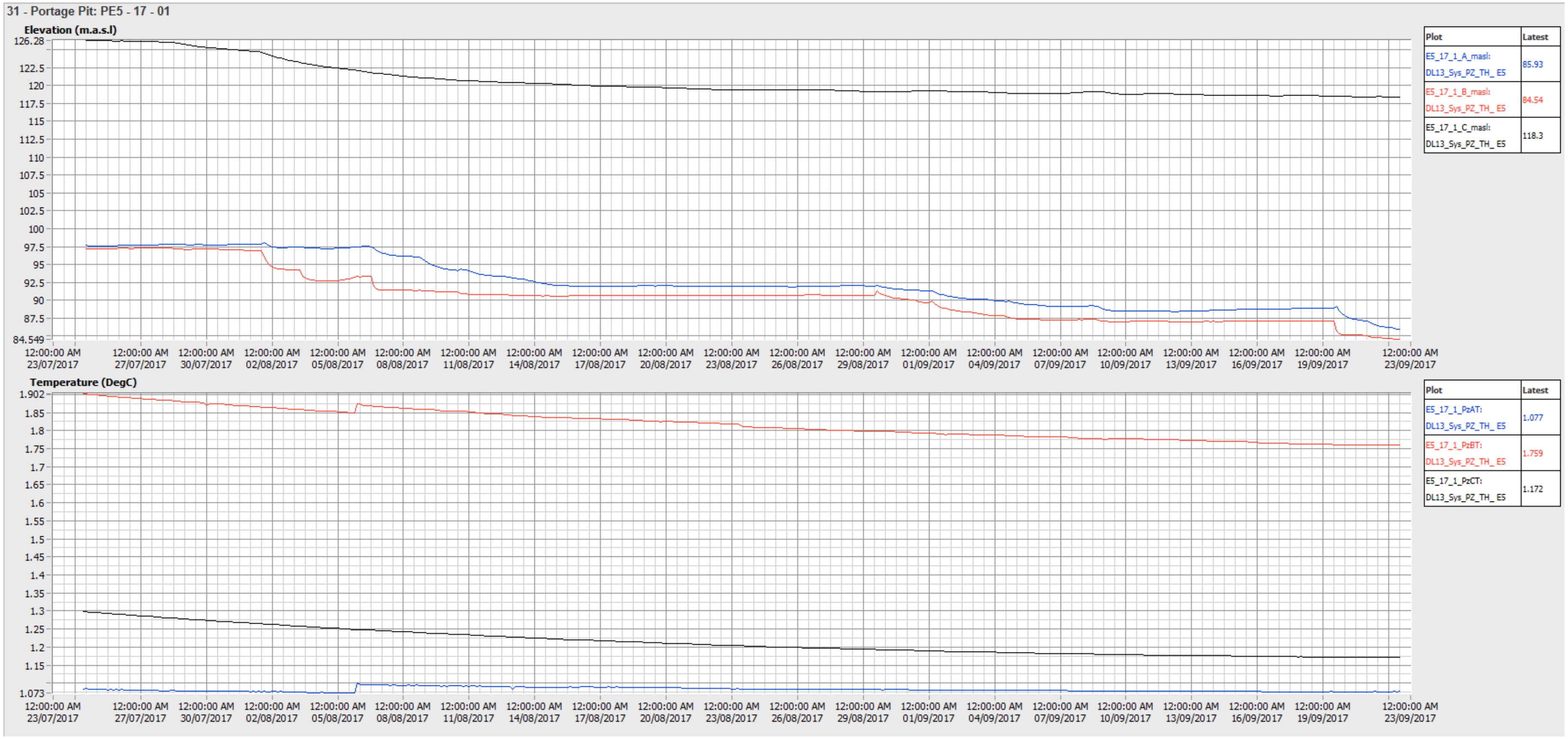
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit E5 Piezometer Data P3E-14

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure A-9



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

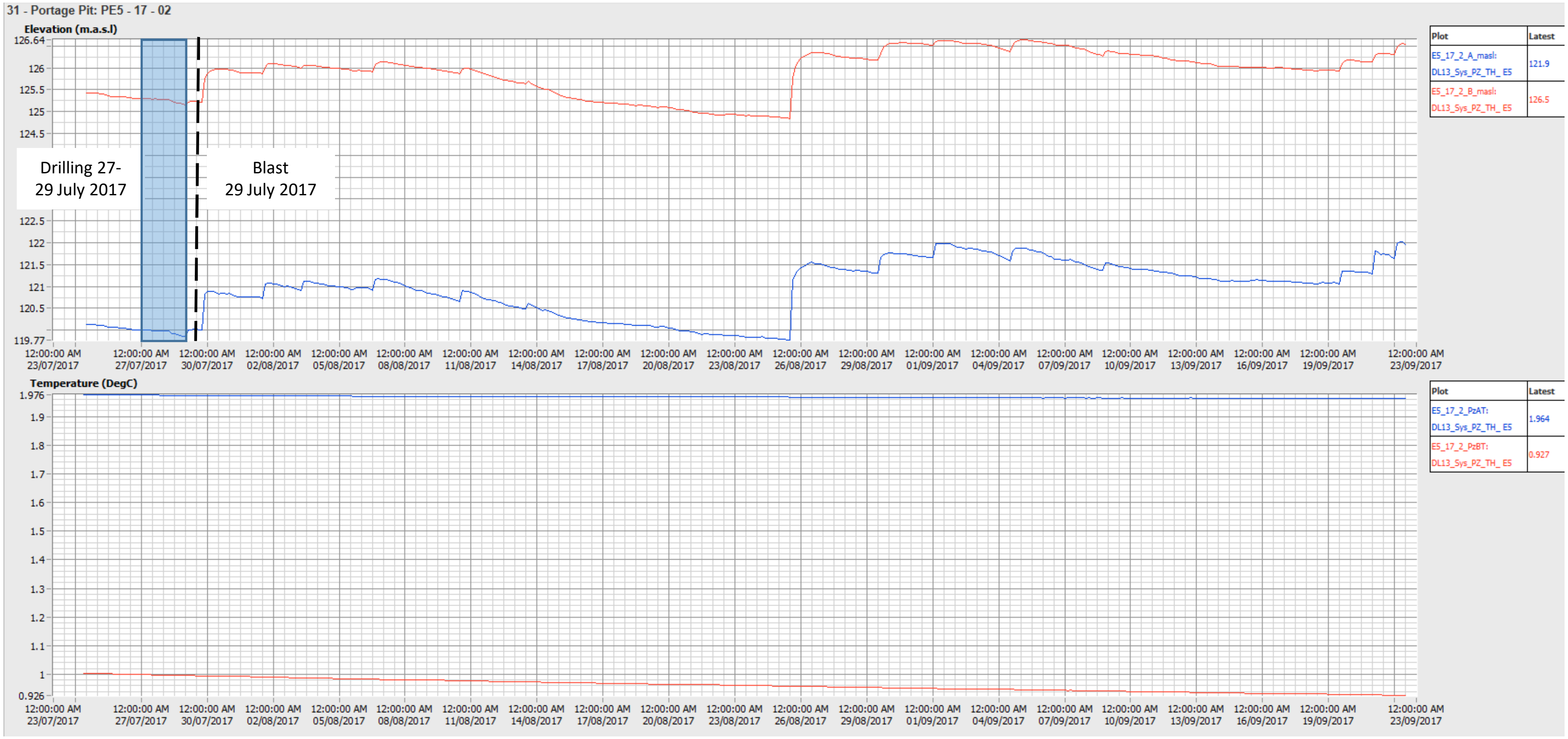
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit E 5 Piezometer Data PE5-17-01

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure A-10



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

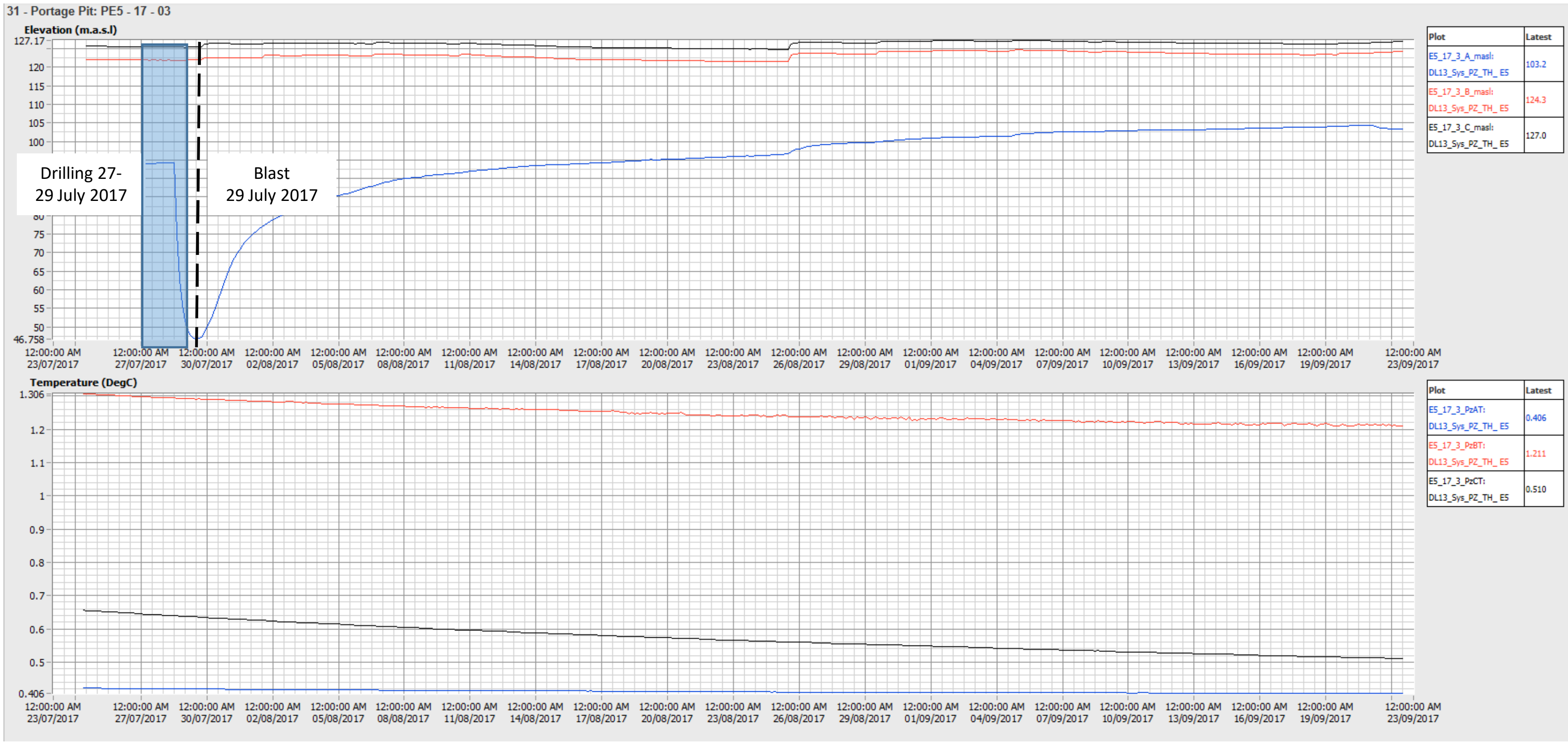
AGNICO EAGLE MEADOWBANK

TETRA TECH

MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit E 5 Piezometer Data PE5-17-02

PROJECT NO.	DWN	CKD	APVD	REV	
704-ENG.ROCK03053-01	JV	CJC	CJC	00	**Figure A-11**
OFFICE	DATE				
VANCOUVER	DECEMBER, 2017				



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

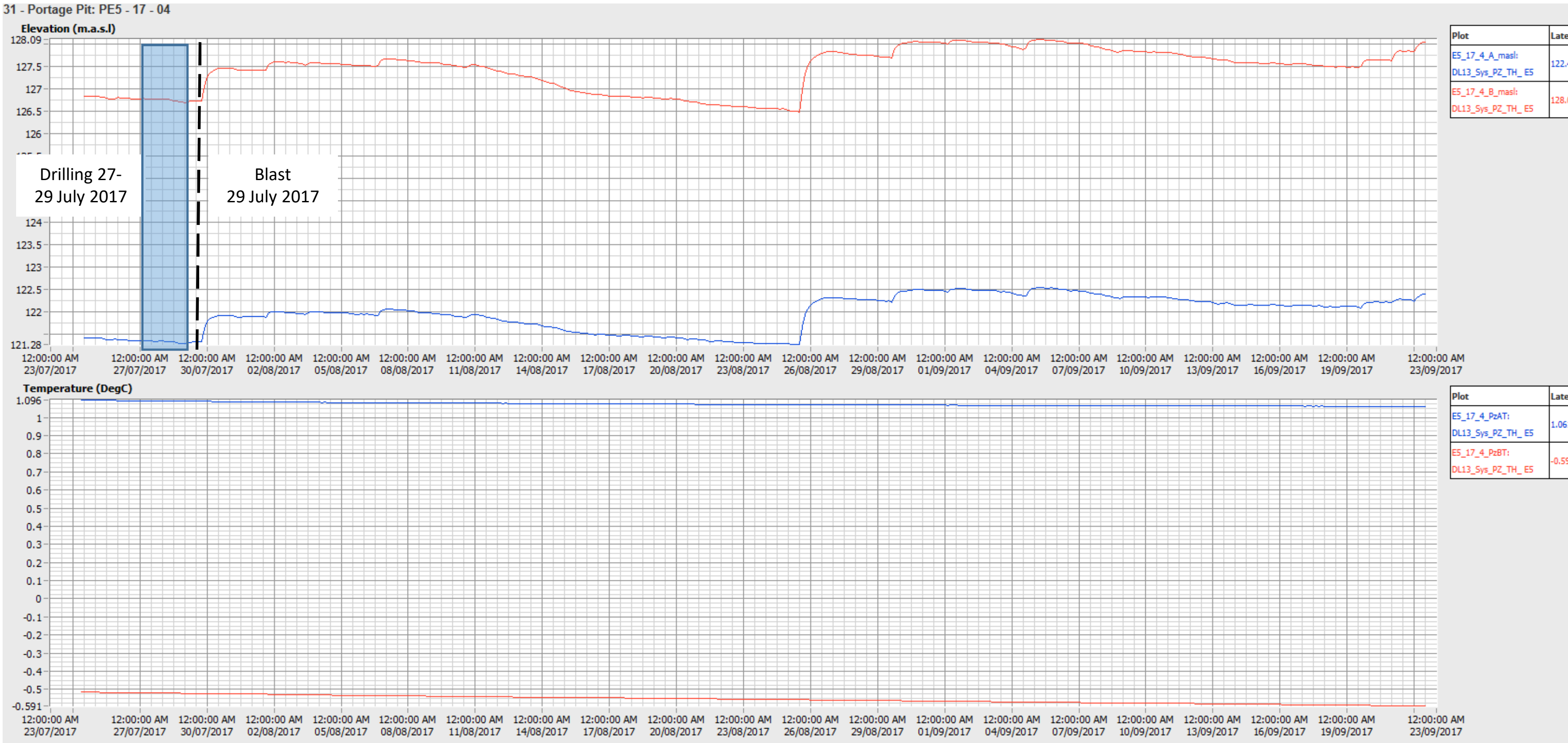
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit E 5 Piezometer Data PE5-17-03

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure A-12



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

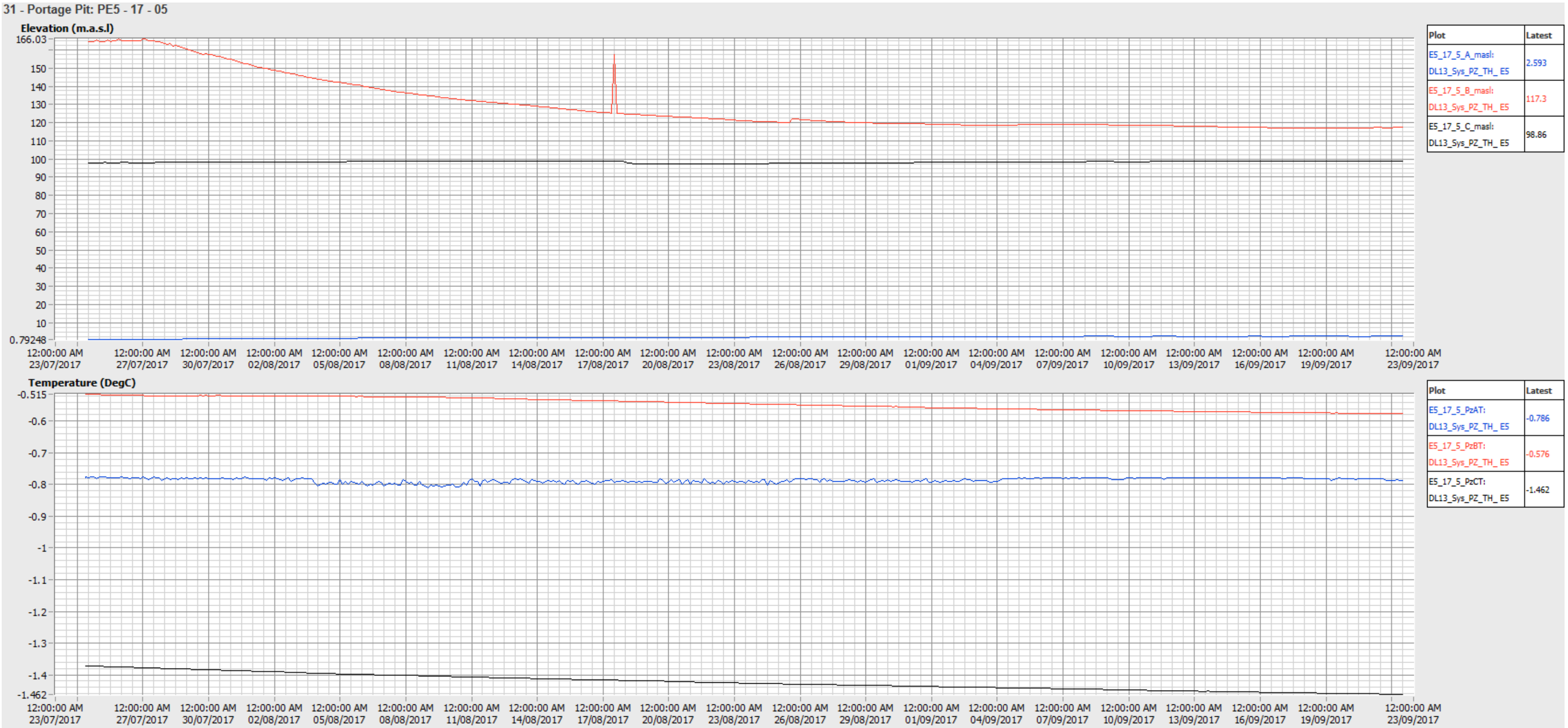
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit E 5 Piezometer Data PE5-17-04

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure A-13



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

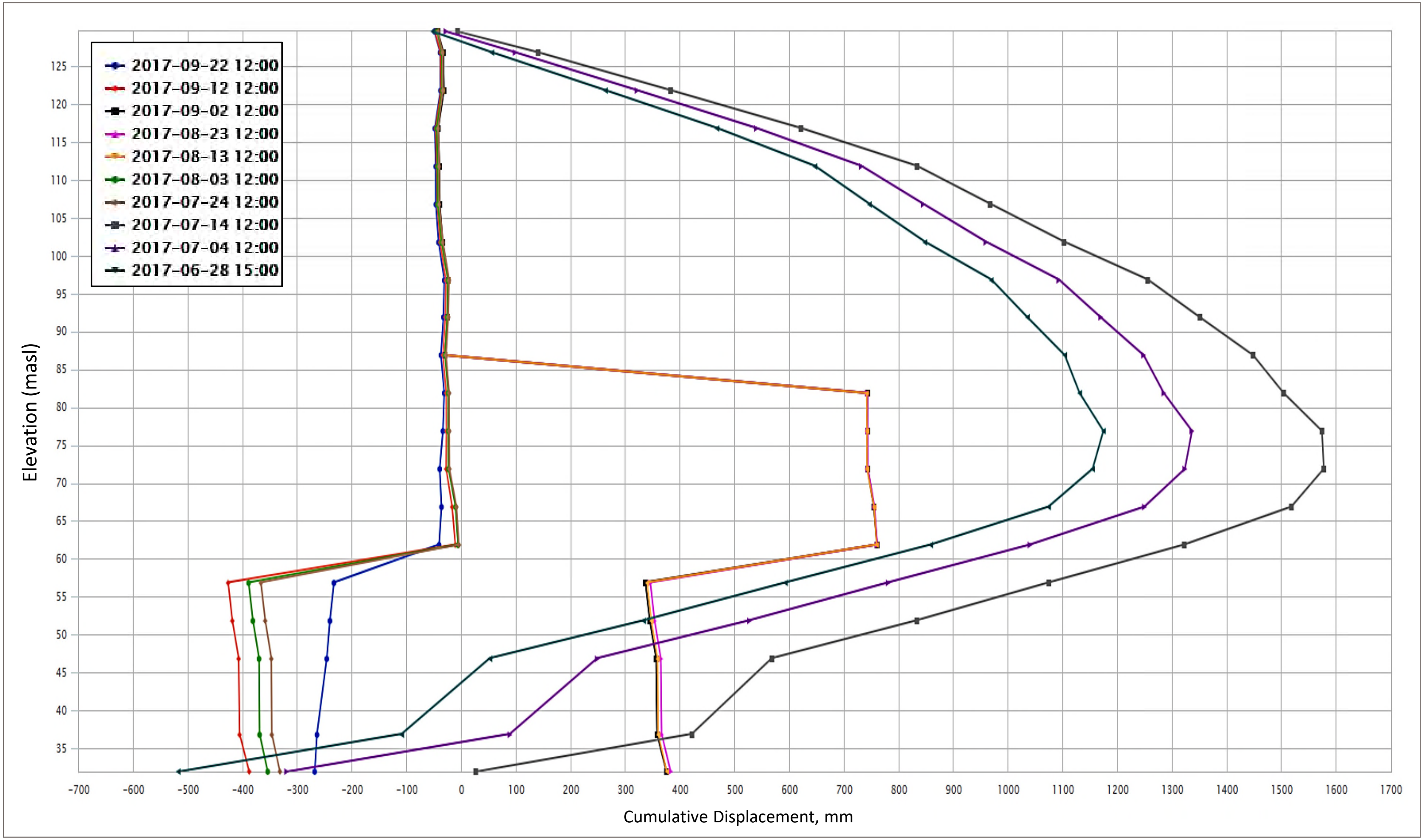
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit E 5 Piezometer Data PE5-17-05

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure A-14



LEGEND

NOTE: INCLINOMETER DATA ARE UNRELIABLE. FOLLOWING MAY 1 2017 DUE TO A MALFUNCTIONING THERMISTOR AT SENSOR 16. AGNICO ARE WORKING WITH THE SUPPLIER TO RESOLVE.

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

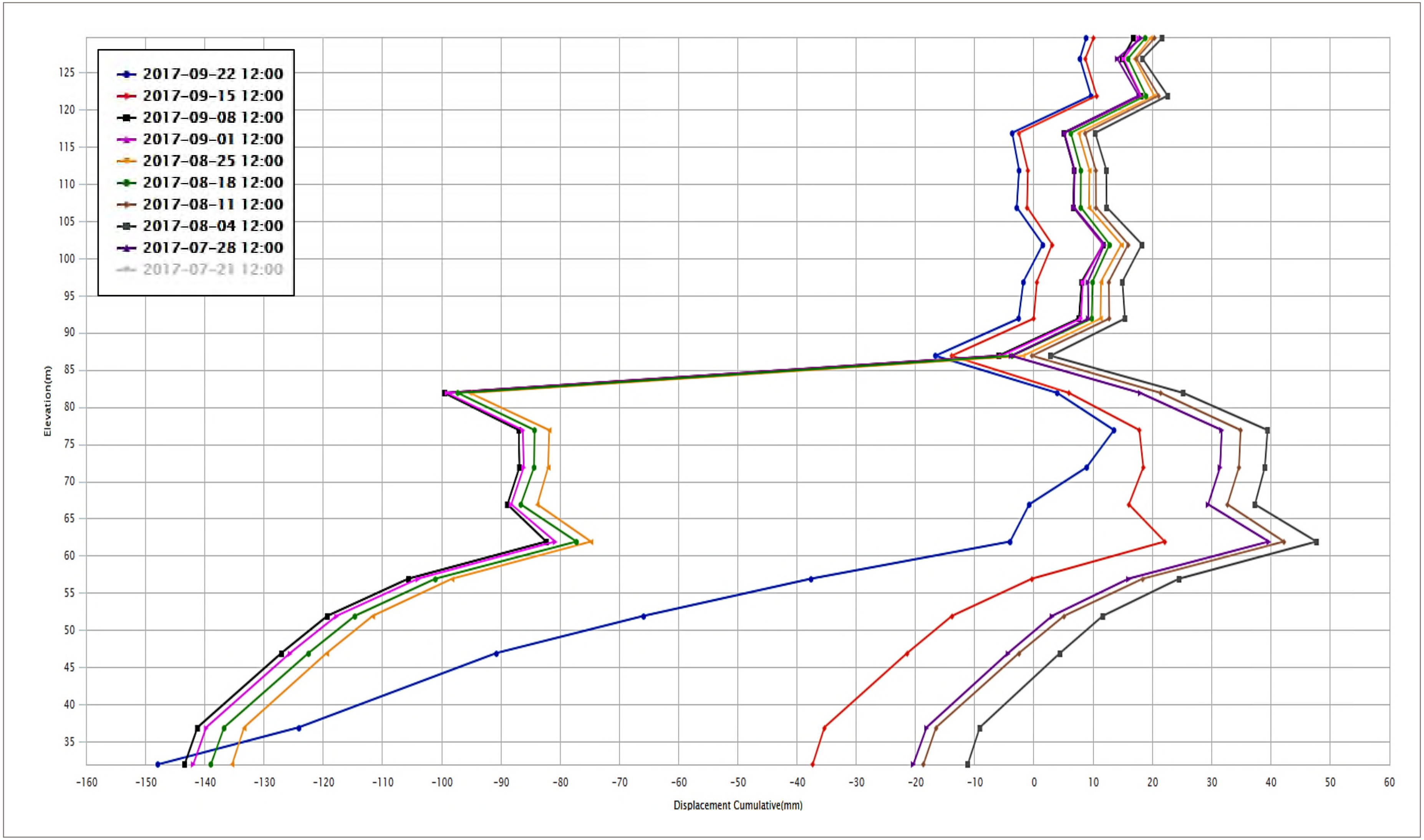
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit E5 Inclinometer Data PE5 A-Axis

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure A-15



LEGEND

NOTE: INCLINOMETER DATA ARE UNRELIABLE. FOLLOWING MAY 1 2017 DUE TO A MALFUNCTIONING THERMISTOR AT SENSOR 16. AGNICO ARE WORKING WITH THE SUPPLIER TO RESOLVE.

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit E 5 Inclinometer Data PE5 B-Axis

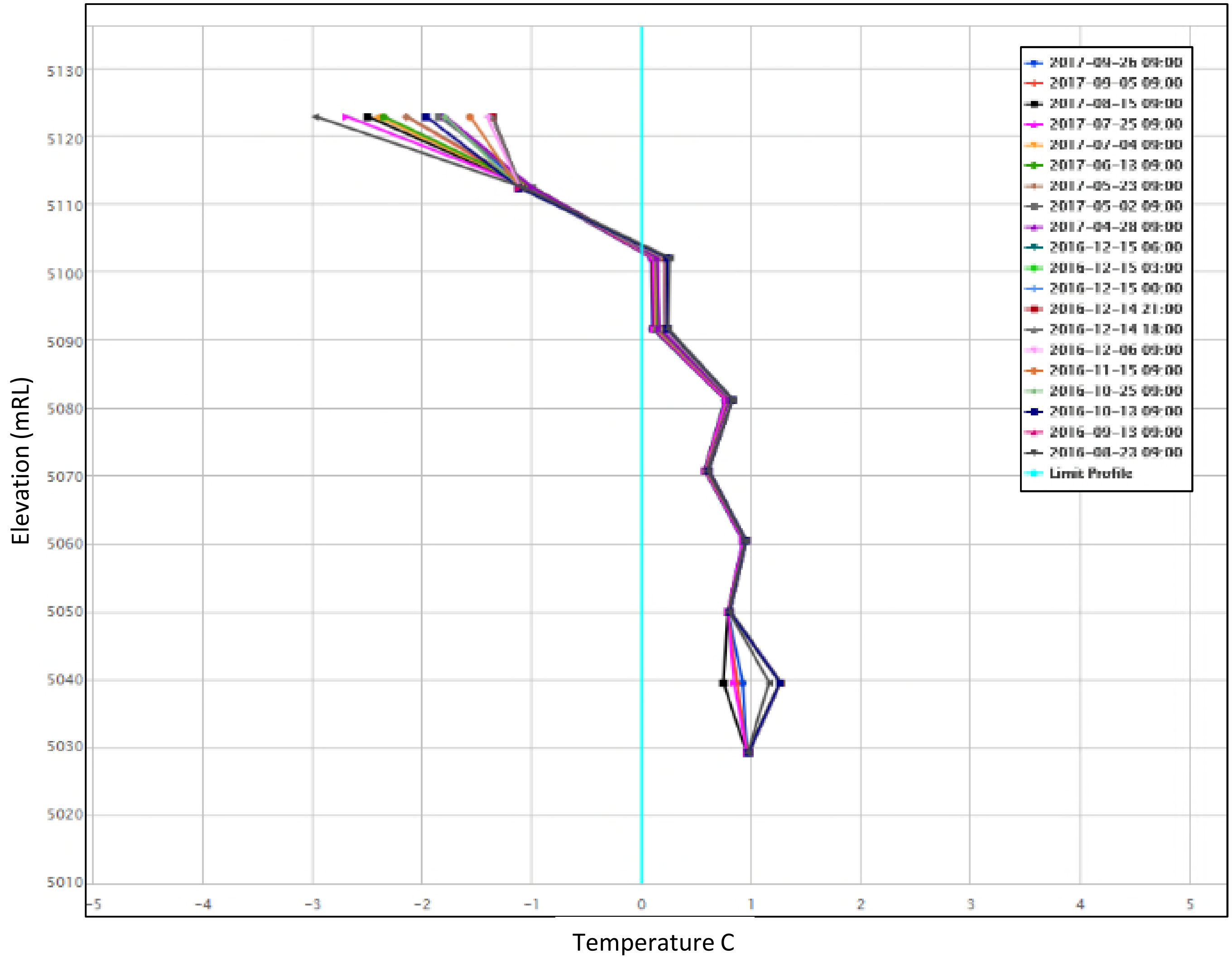
PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure A-16

APPENDIX B

GOOSE PIT INSTRUMENTATION DATA



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE
MEADOWBANK

TETRA TECH

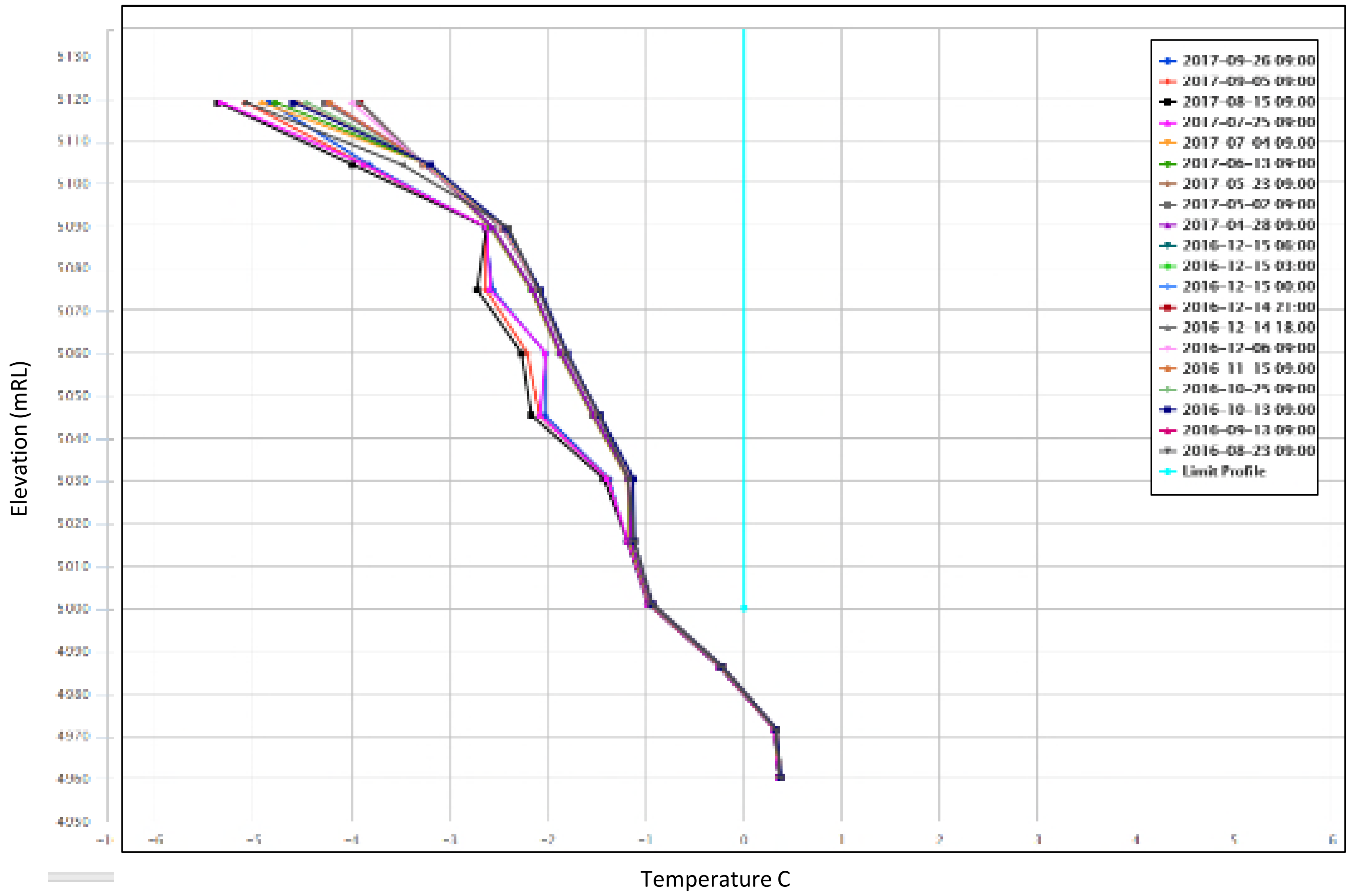
MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Goose Pit
Thermistor Cable GPIT-13

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-1



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

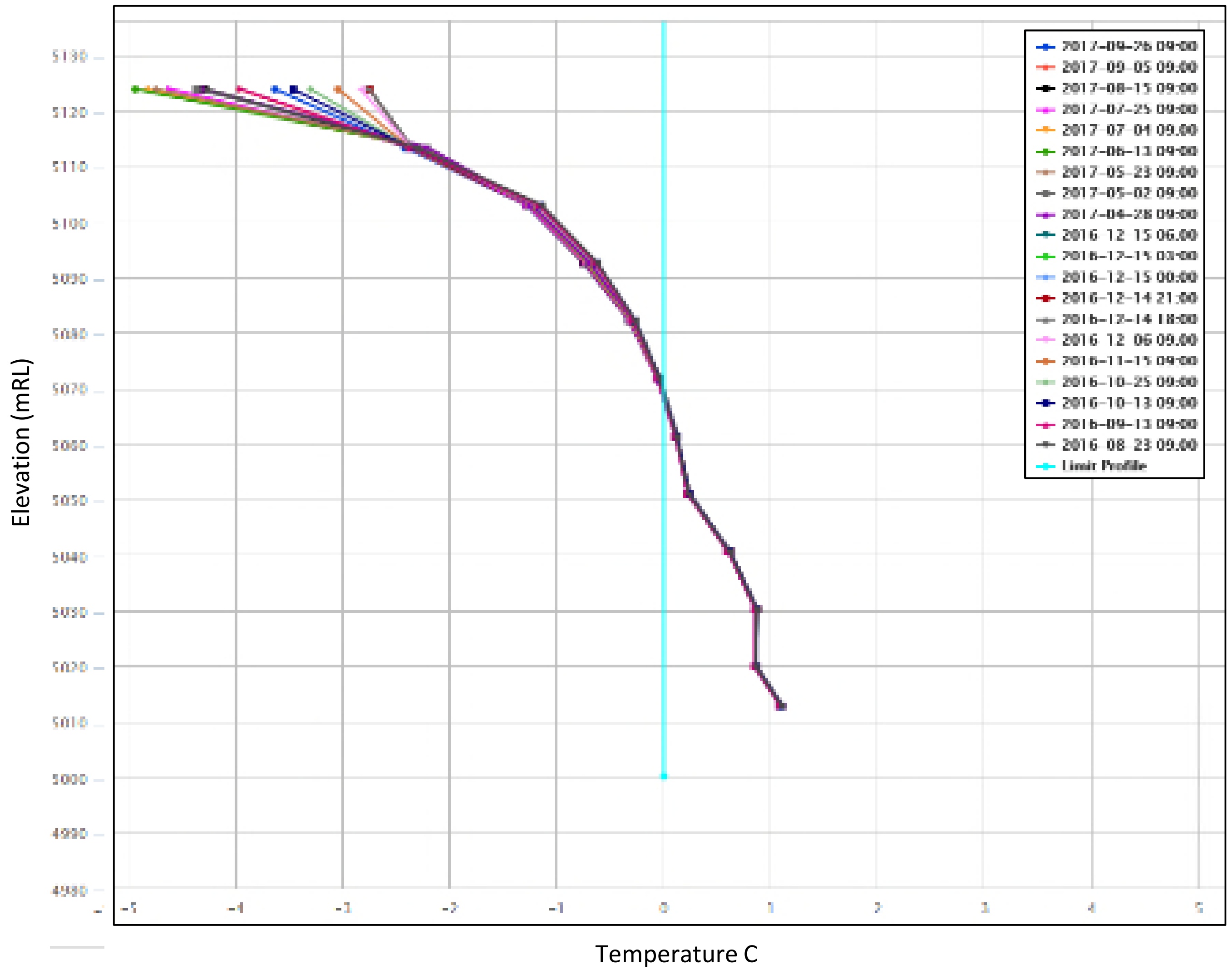
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Goose Pit Thermistor Cable GPIT-14

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-2



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

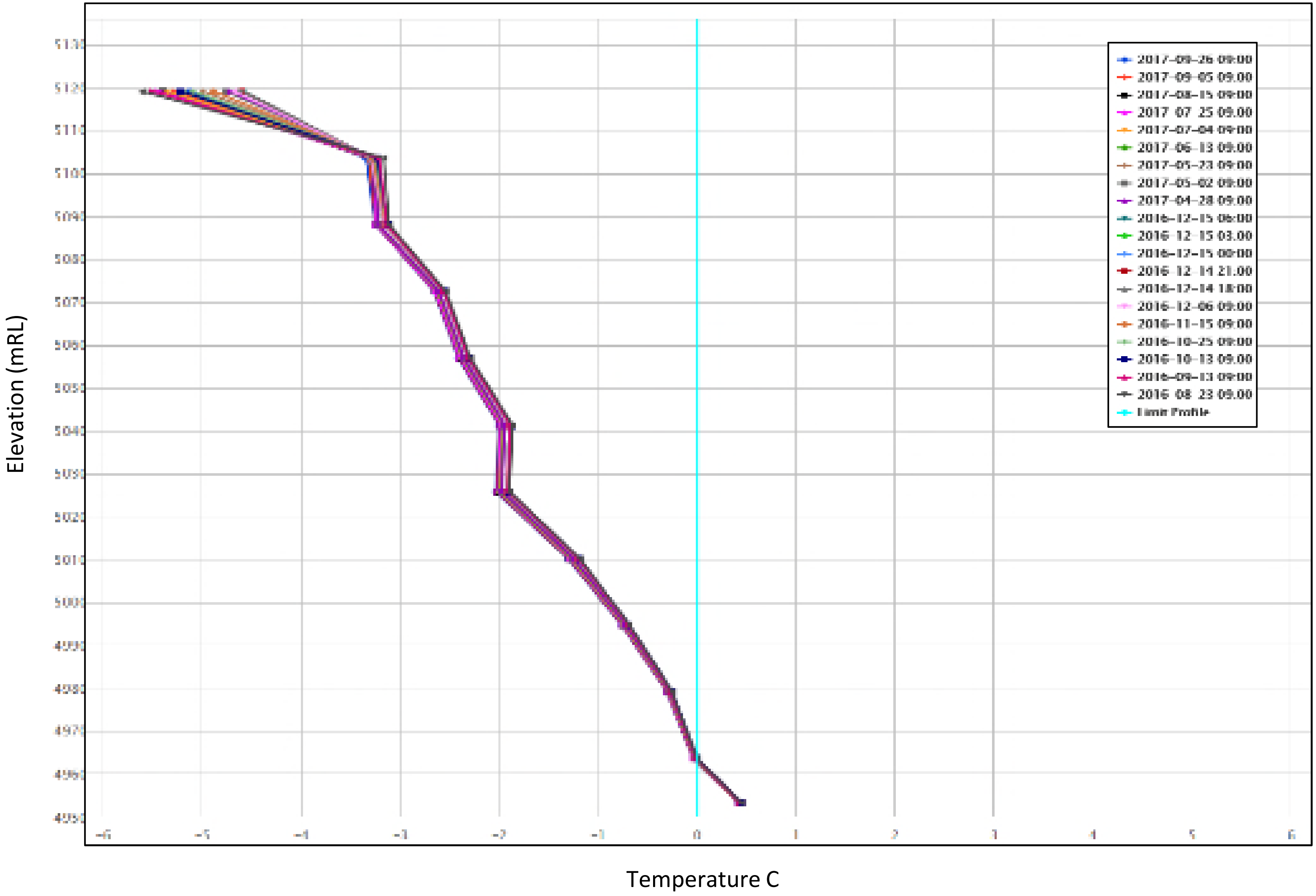
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Goose Pit Thermistor Cable GPIT-16

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-3



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

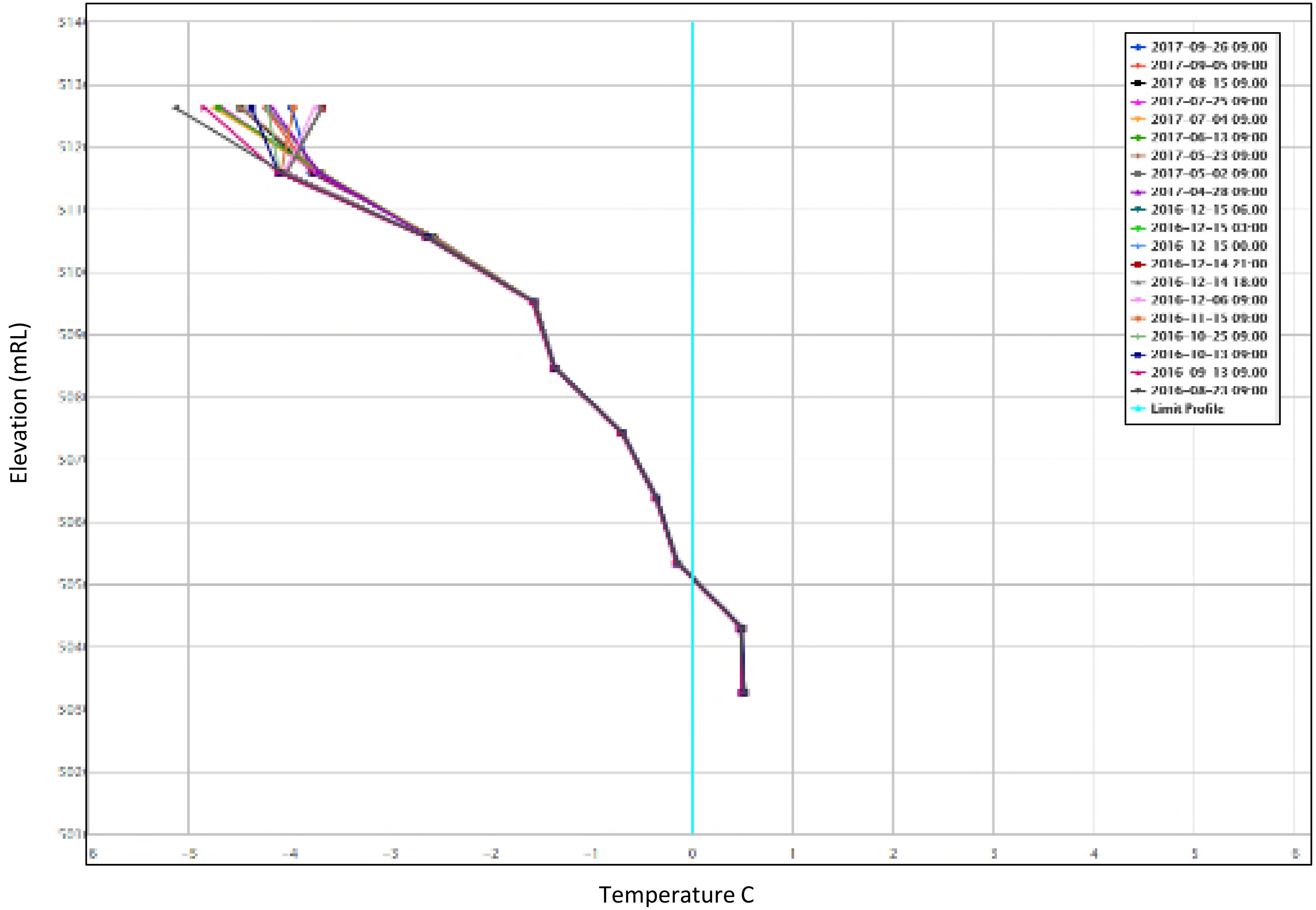
MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Goose Pit
Thermistor Cable GPIT-17

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-4



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE
MEADOWBANK

TETRA TECH

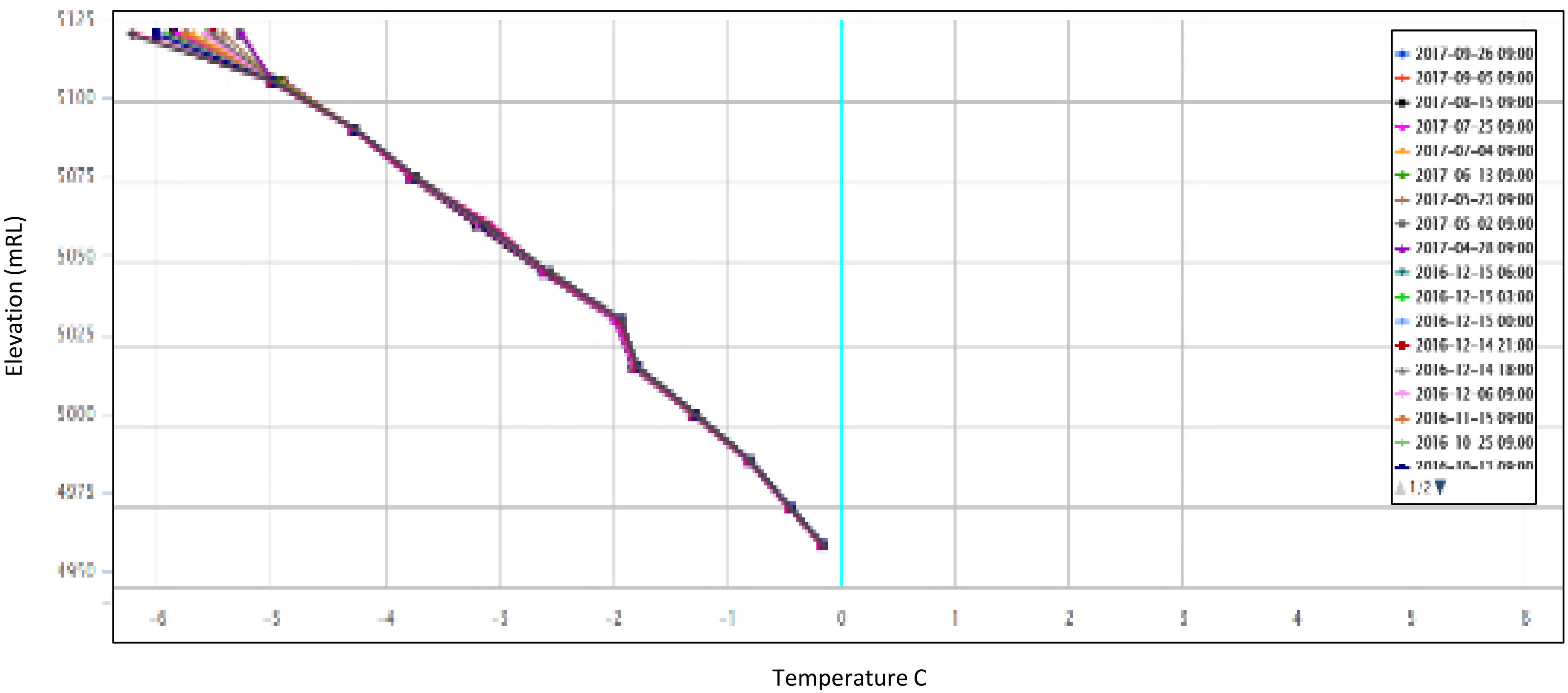
MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Goose Pit
Thermistor Cable GPIT-19

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-5



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE
MEADOWBANK

TETRA TECH

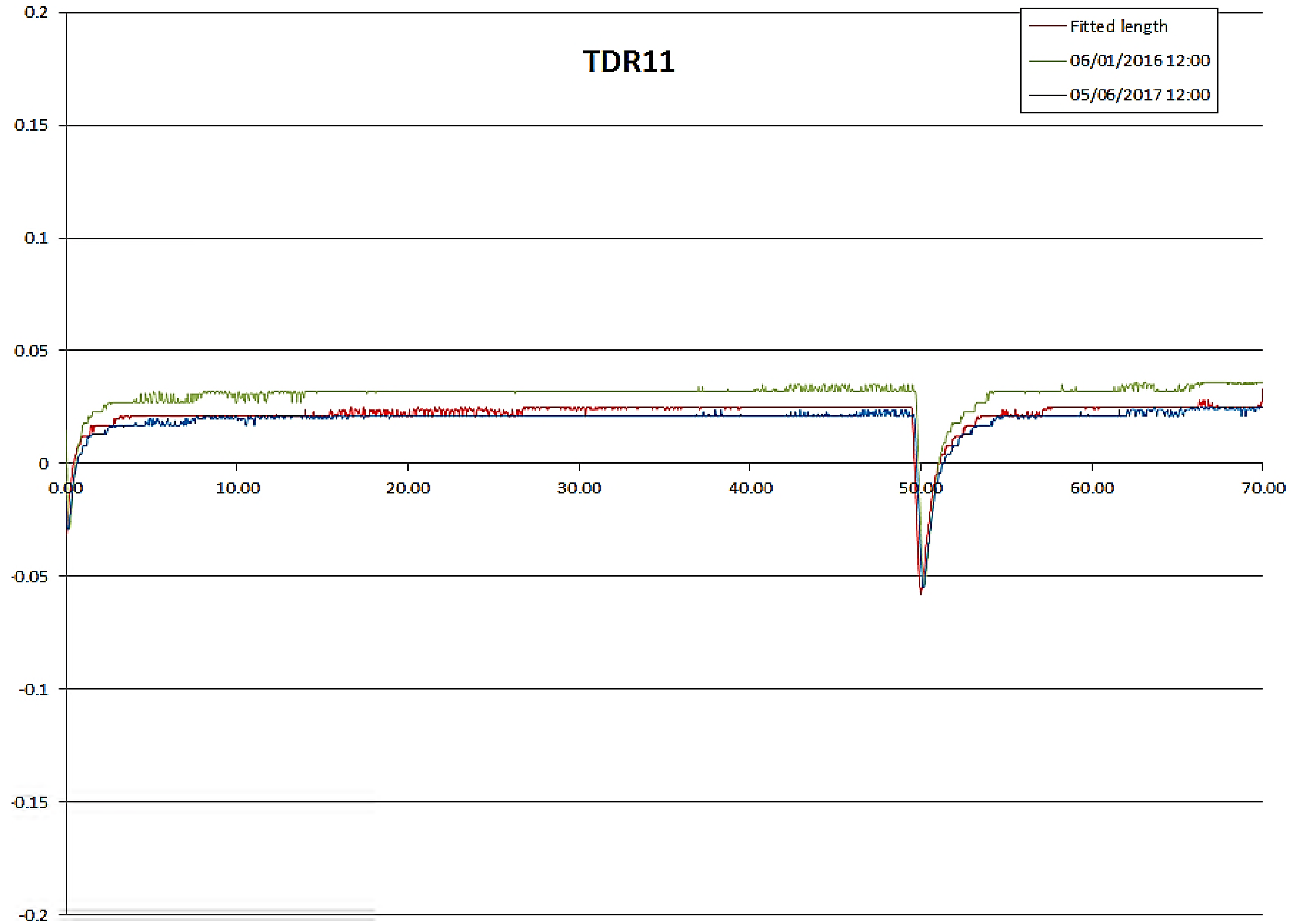
MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Goose Pit
Thermistor Cable GPIT-20

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-6



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

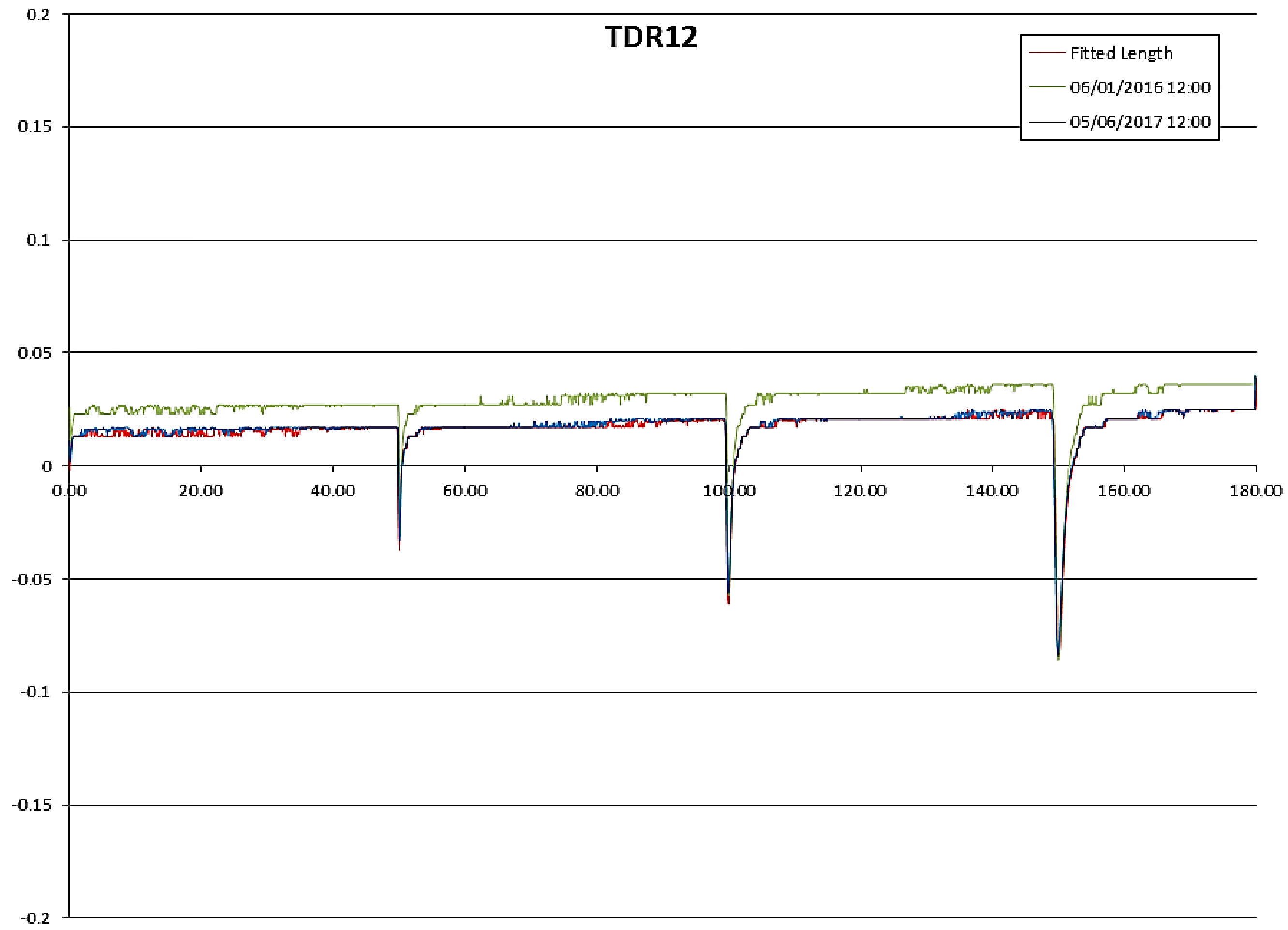
MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Goose Pit
TDR Data TDR-11

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-7



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

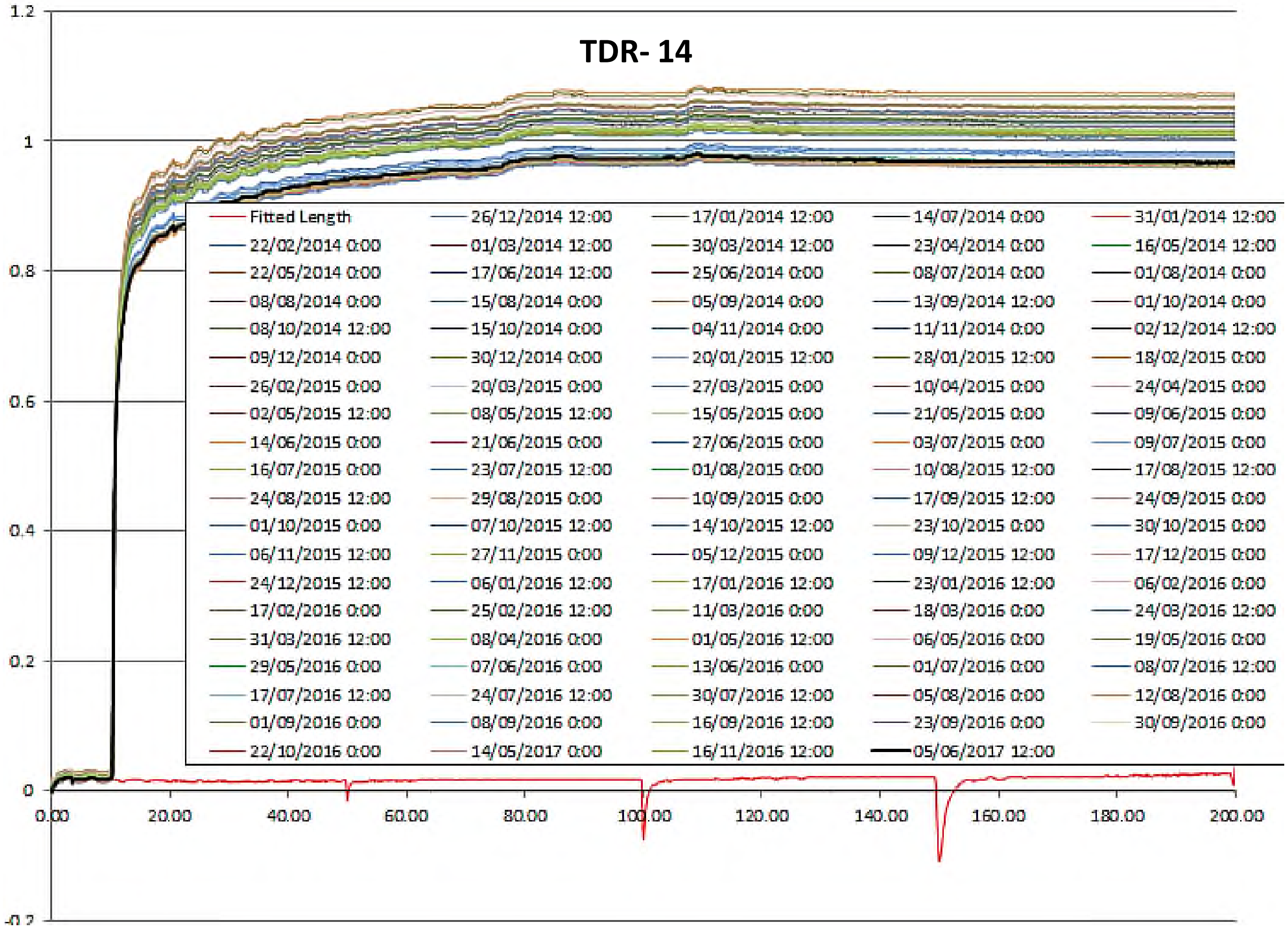
MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Goose Pit
TDR Data TDR-12

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-8



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

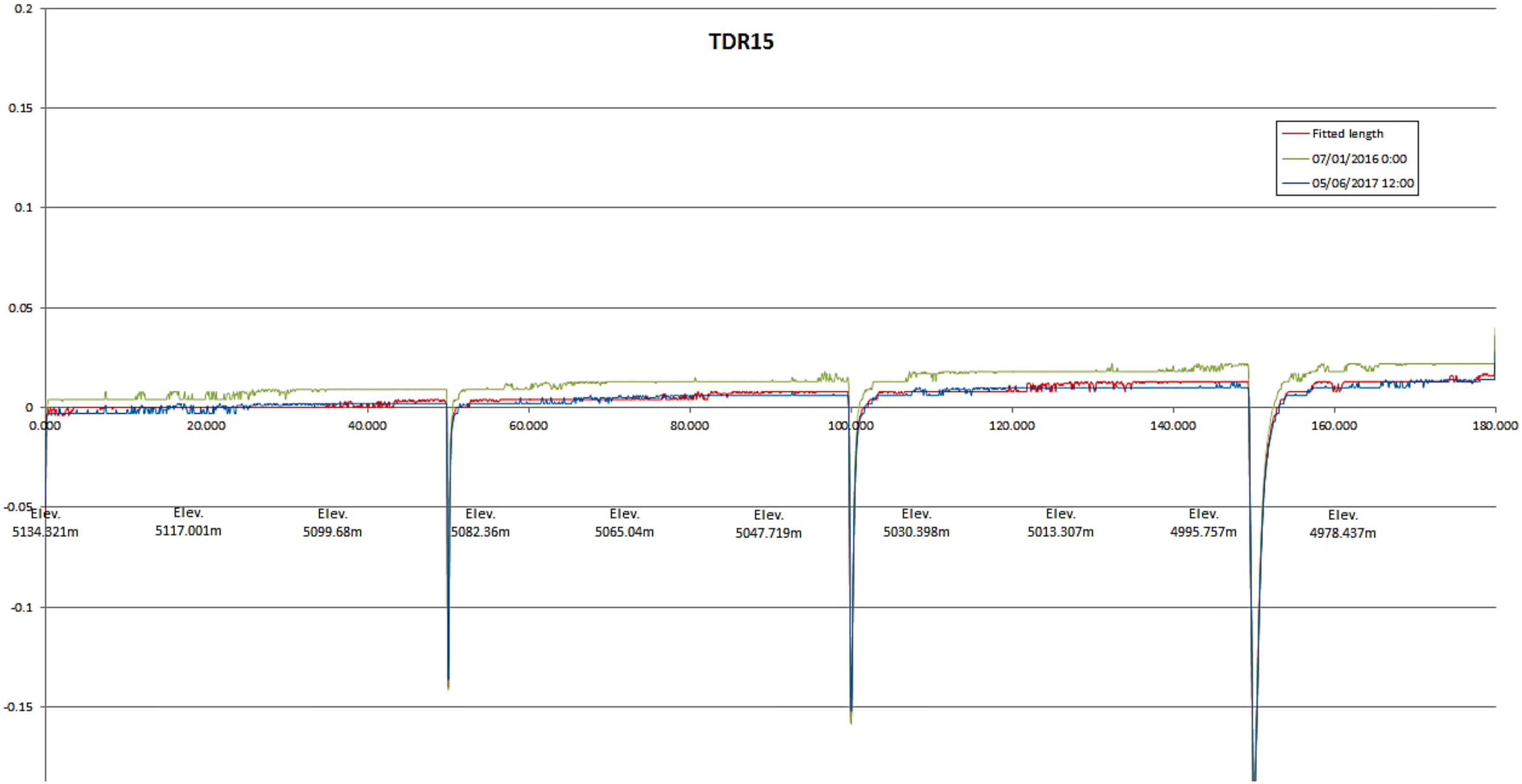
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Goose Pit TDR Data TDR-14

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-9



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

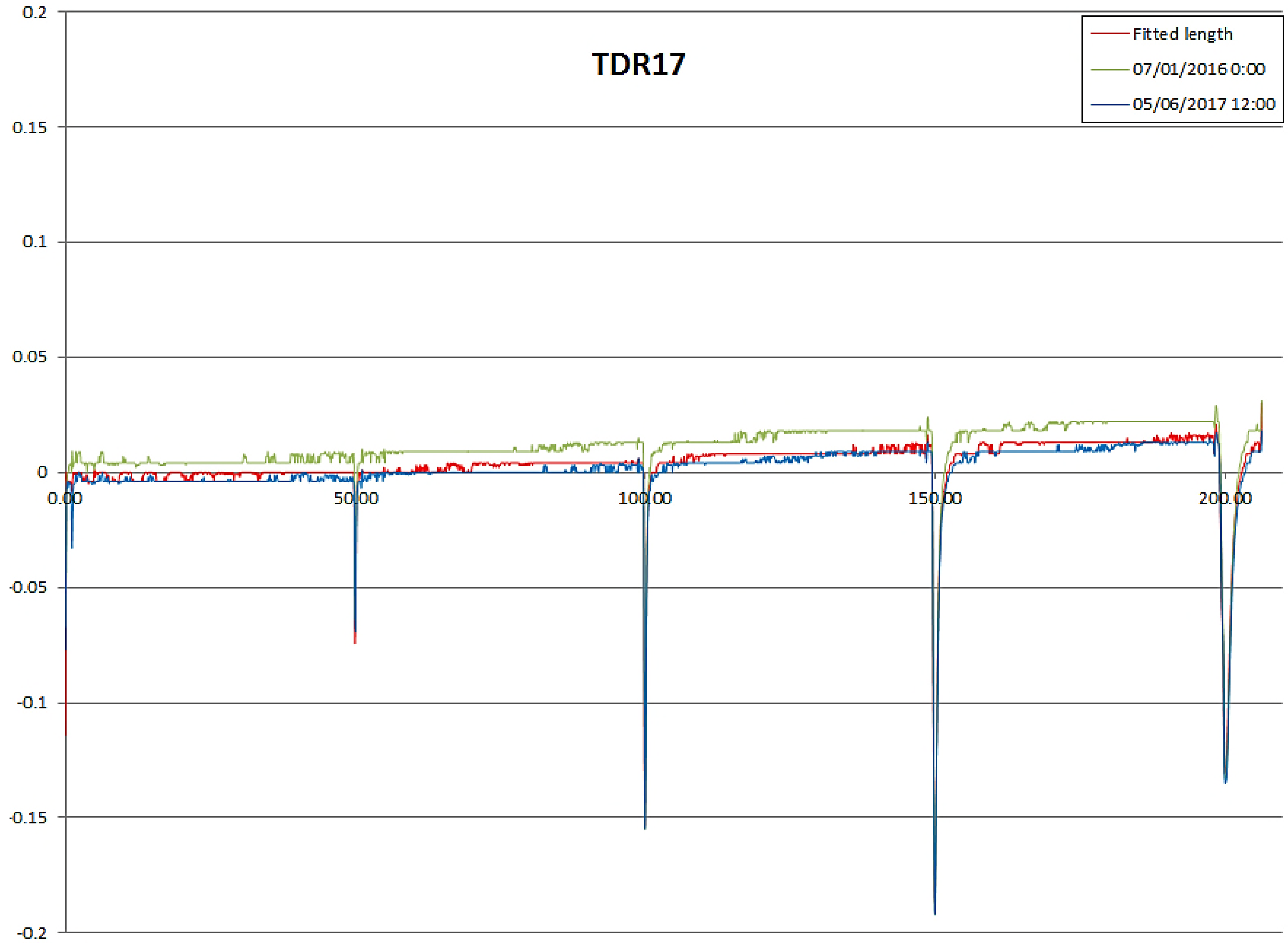
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Goose Pit TDR Data TDR-15

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-10



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

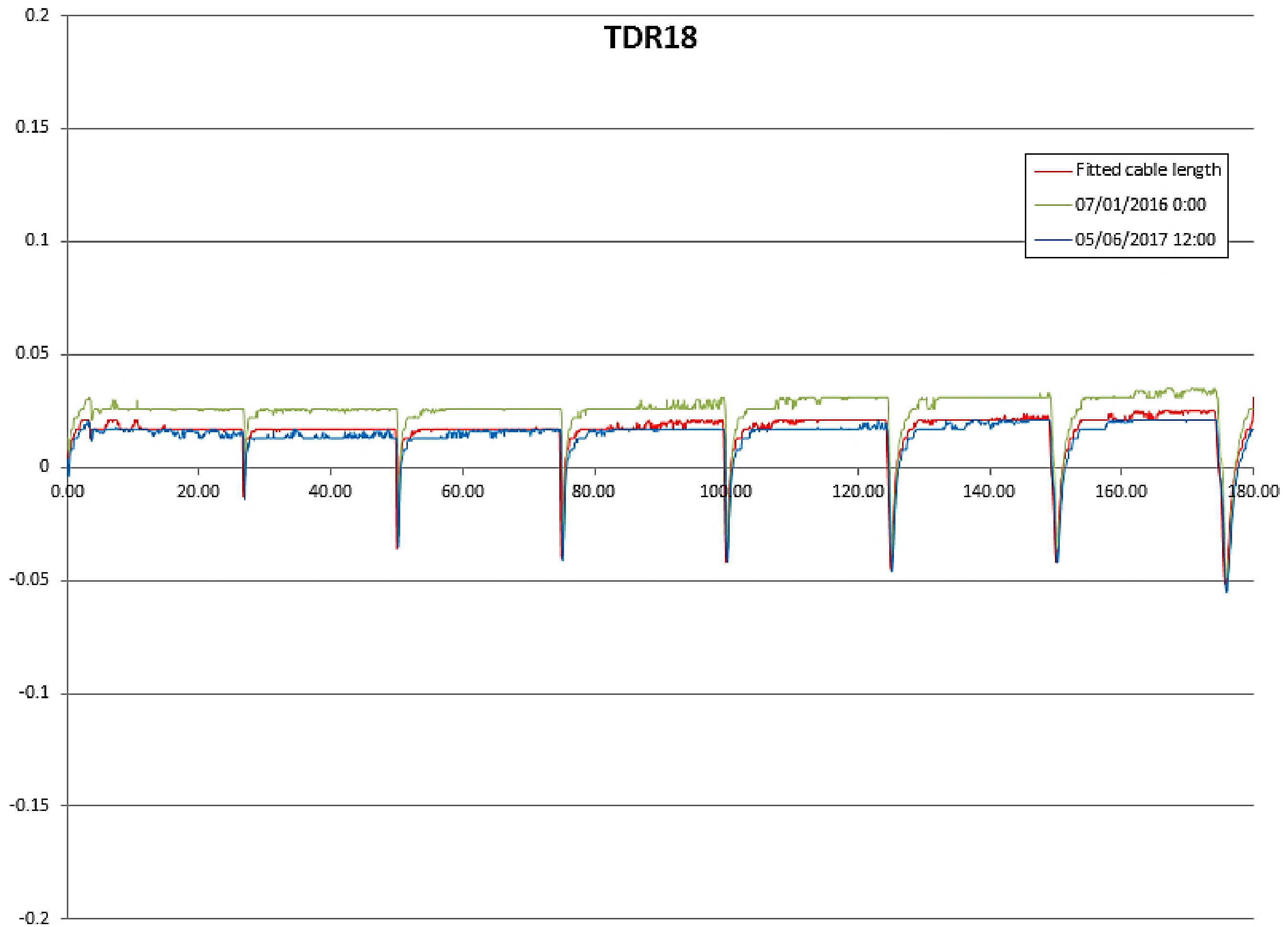
MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Goose Pit
TDR Data TDR-17

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-11



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

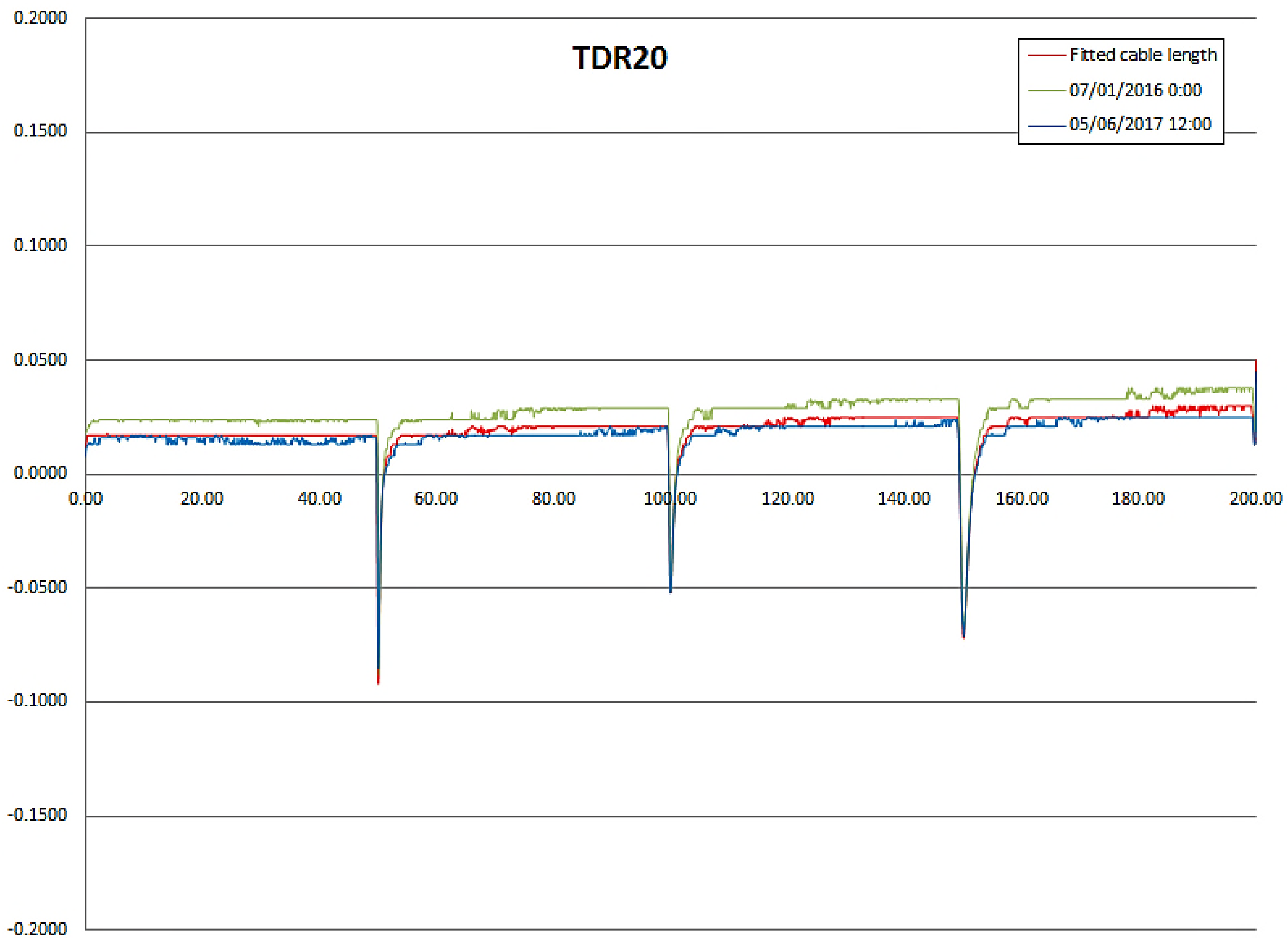
MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Goose Pit
TDR Data TDR-18

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-12



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

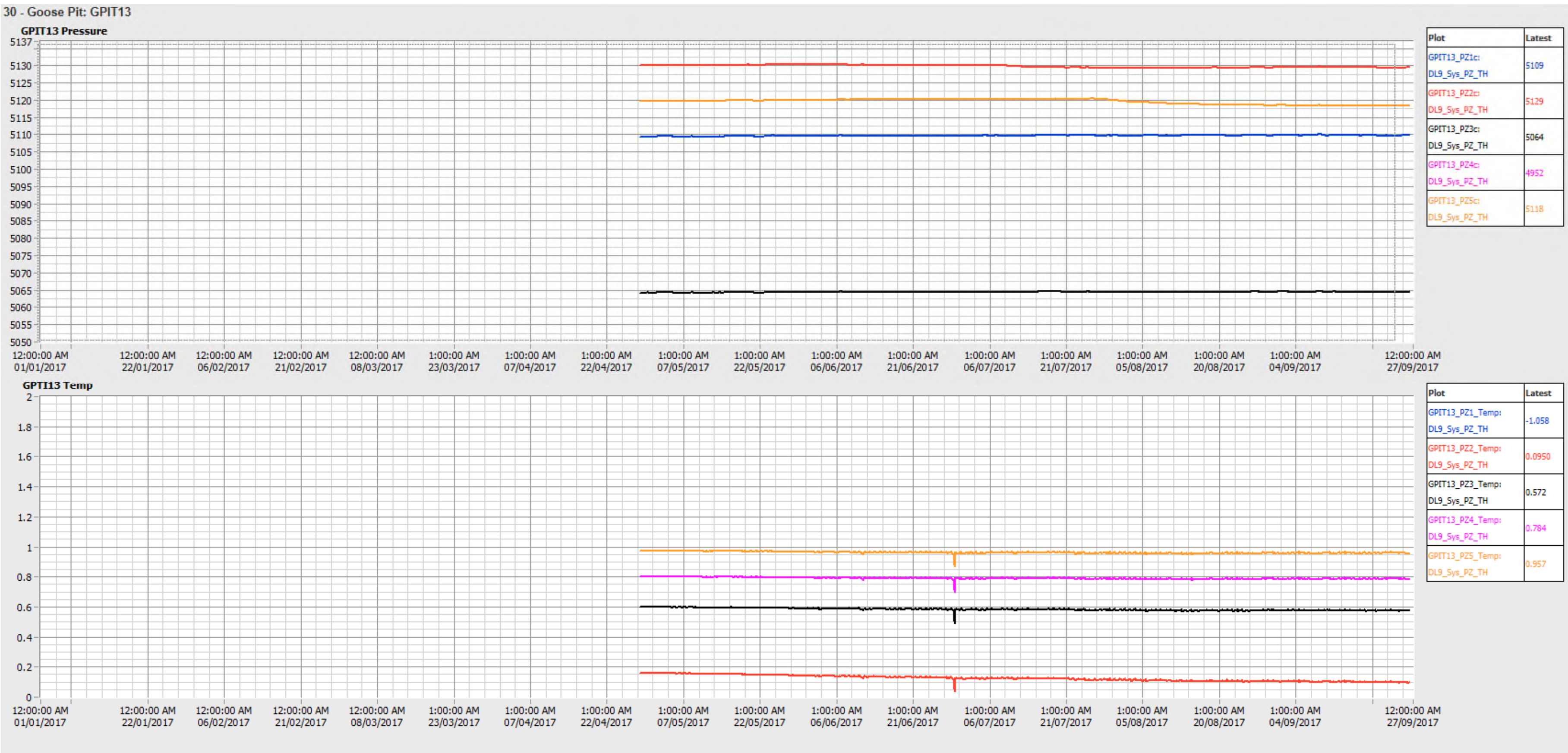
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Goose Pit TDR Data TDR-20

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-13



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

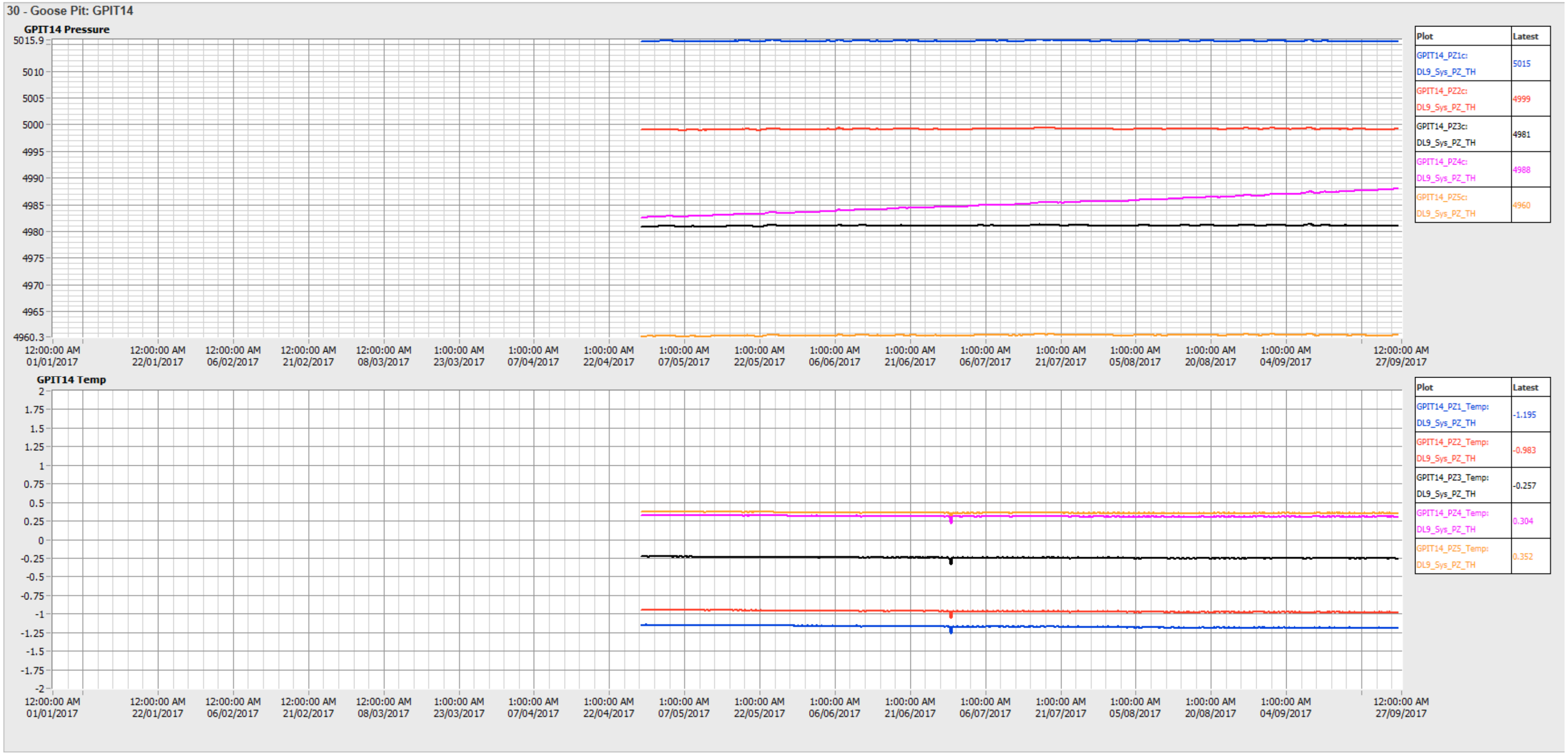
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Goose Pit Piezometer Data GPIT-13

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-14



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

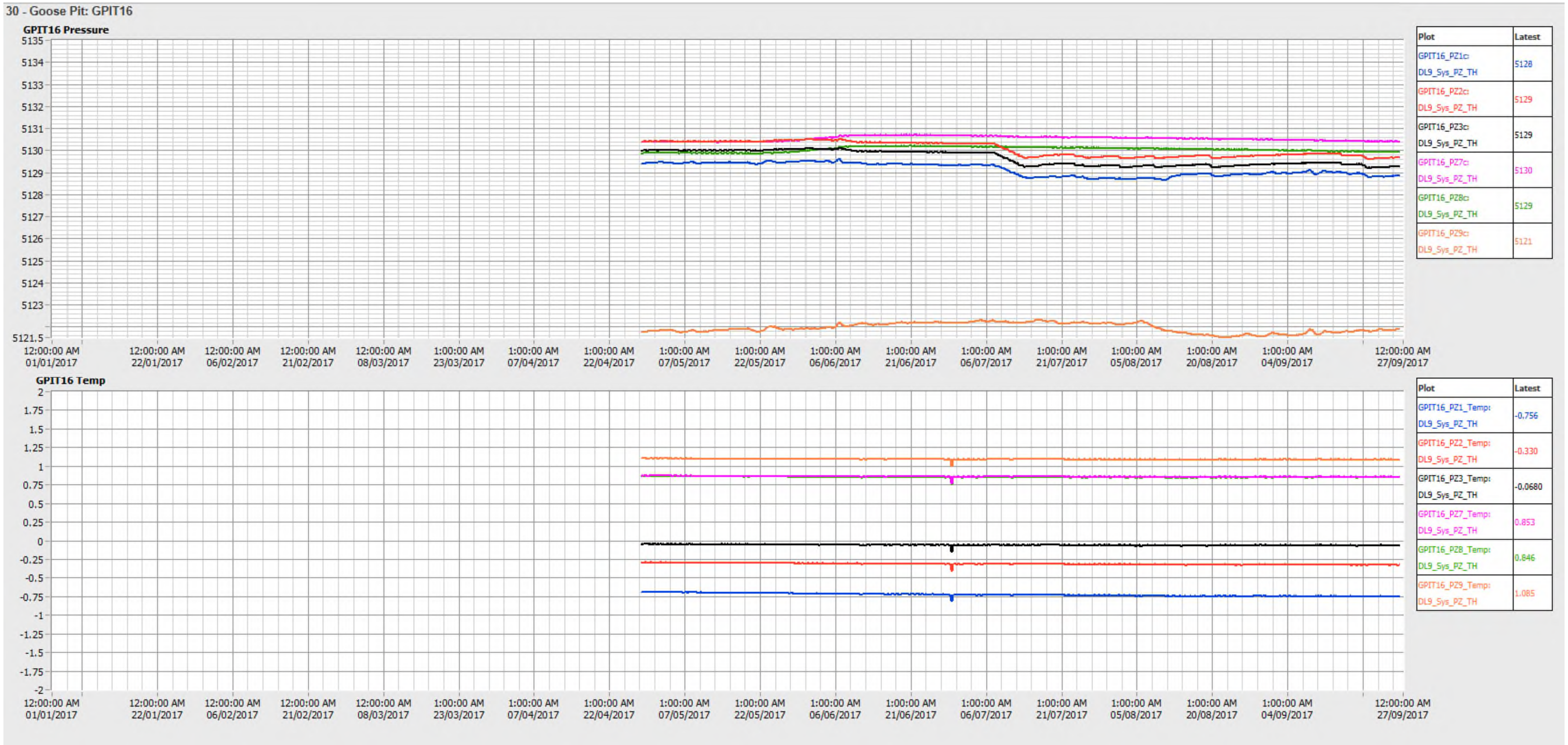
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Goose Pit Piezometer Data GPIT-14

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-15



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

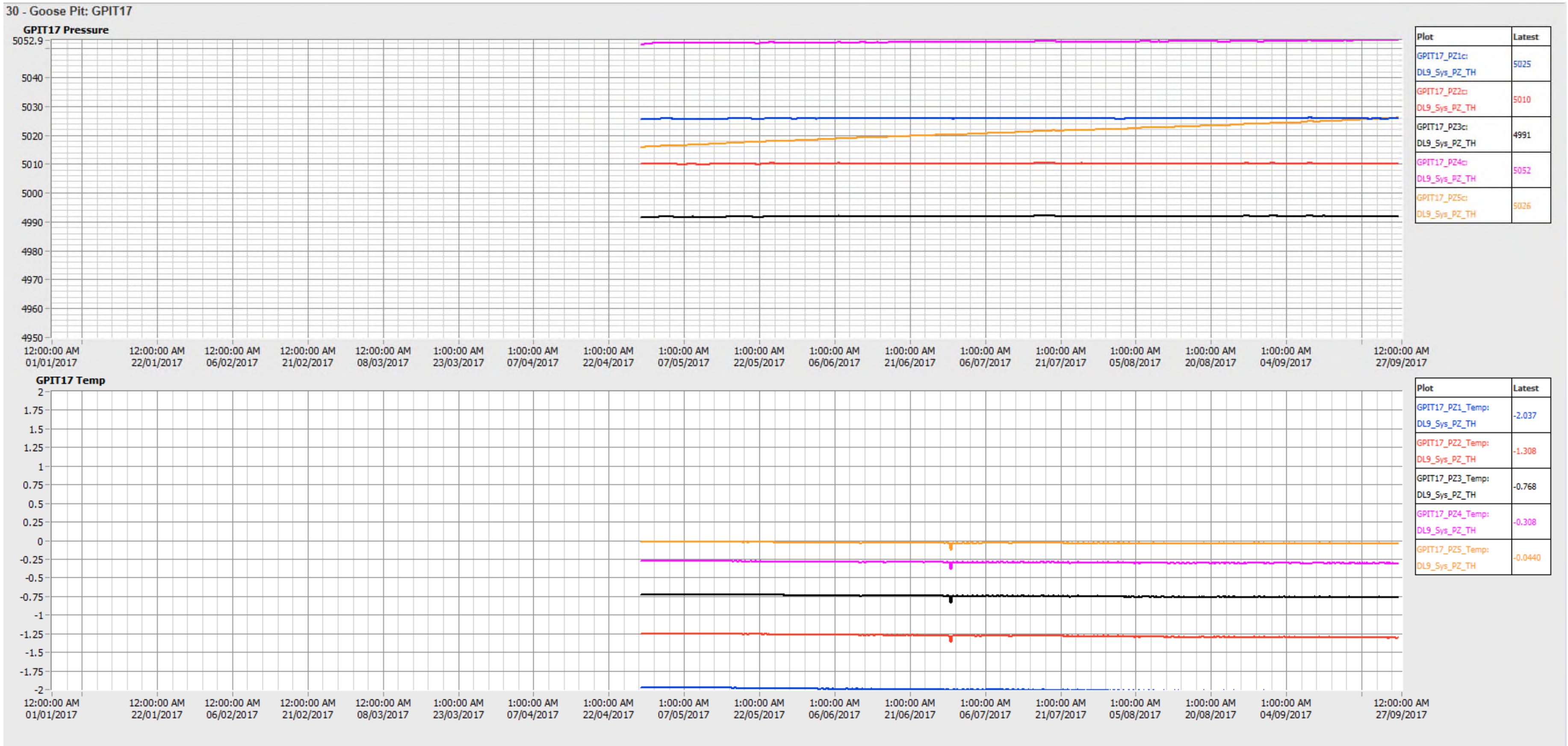
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Goose Pit Piezometer Data GPIT-16

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-16



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

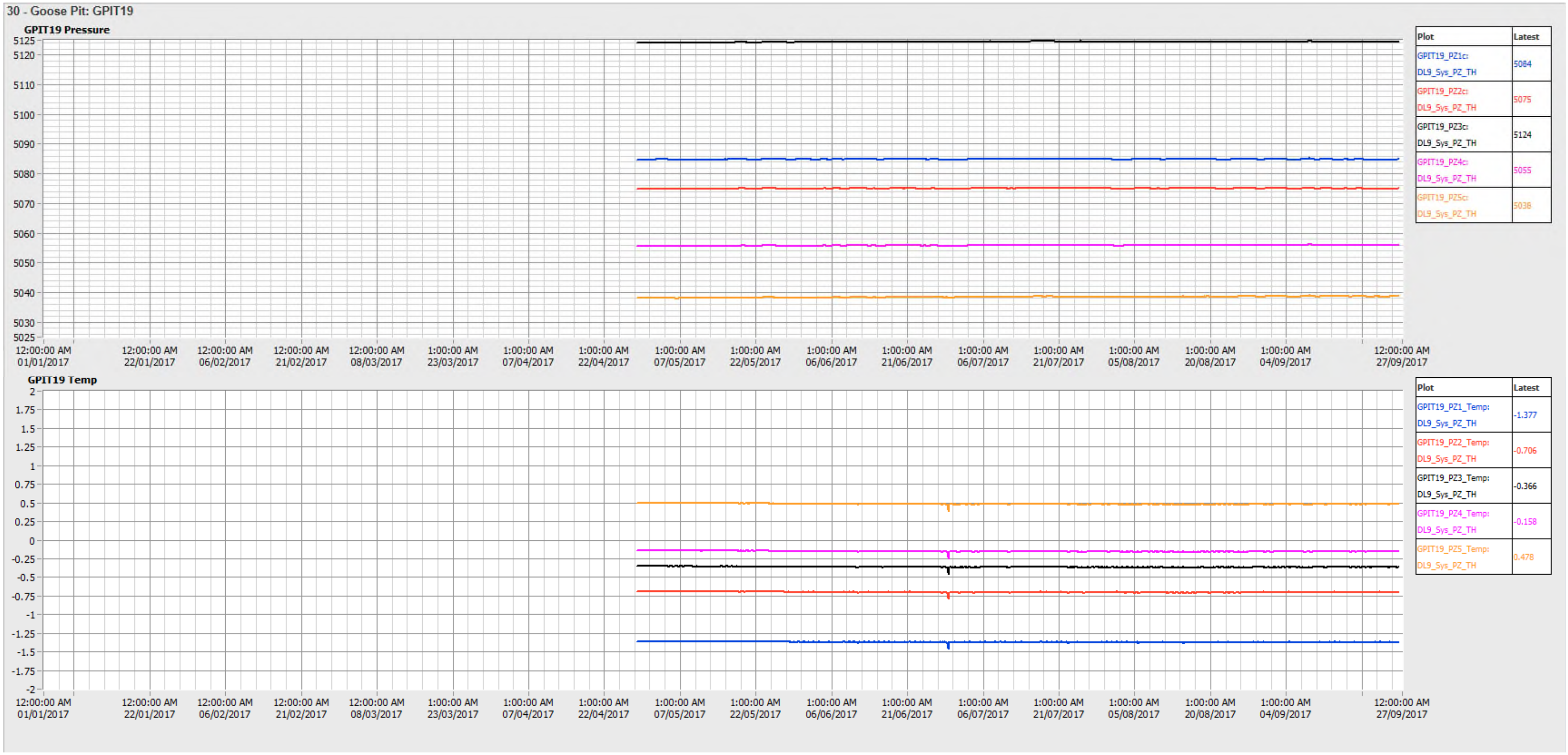
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Goose Pit Piezometer Data GPIT-17

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-17



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

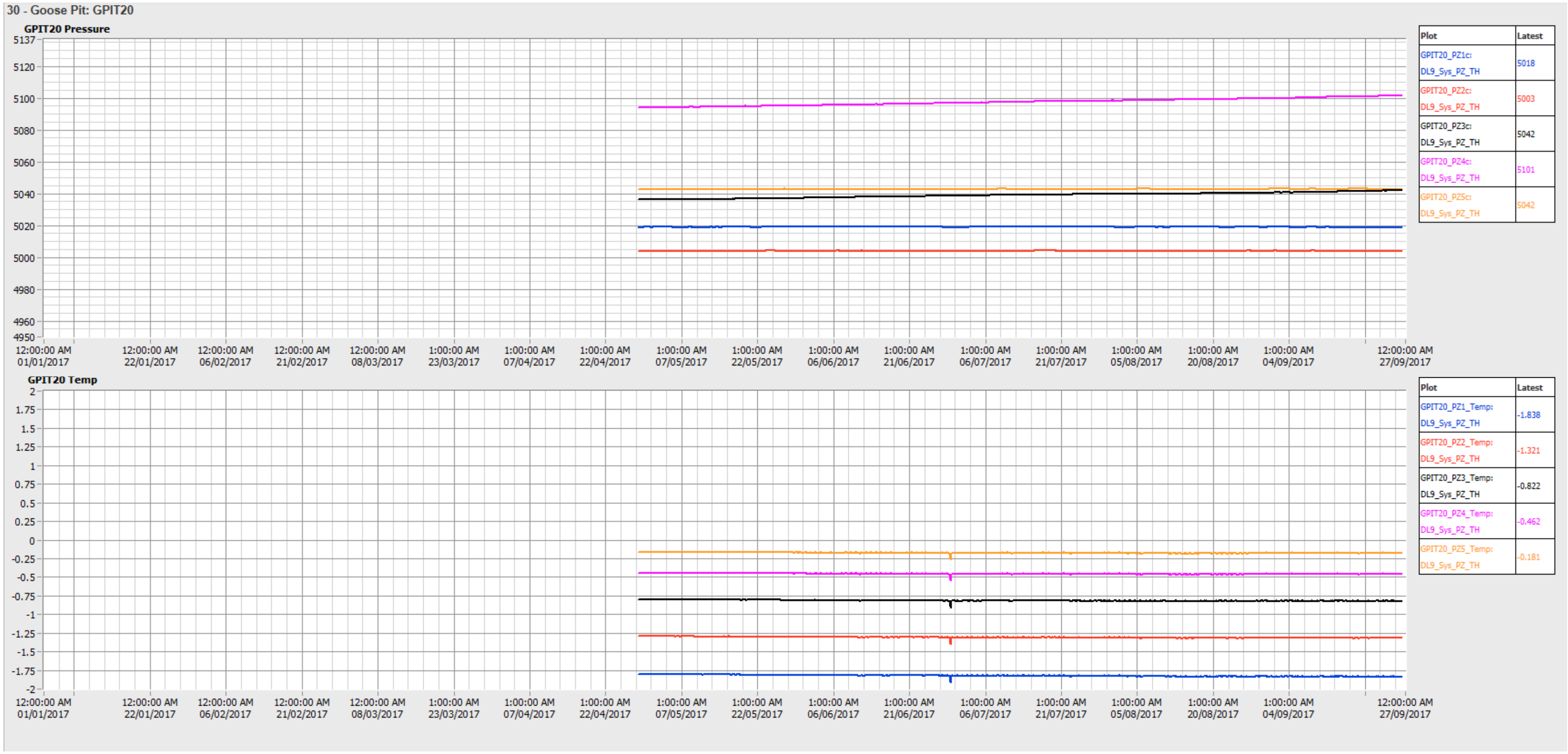
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Goose Pit Piezometer Data GPIT-19

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure B-18



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

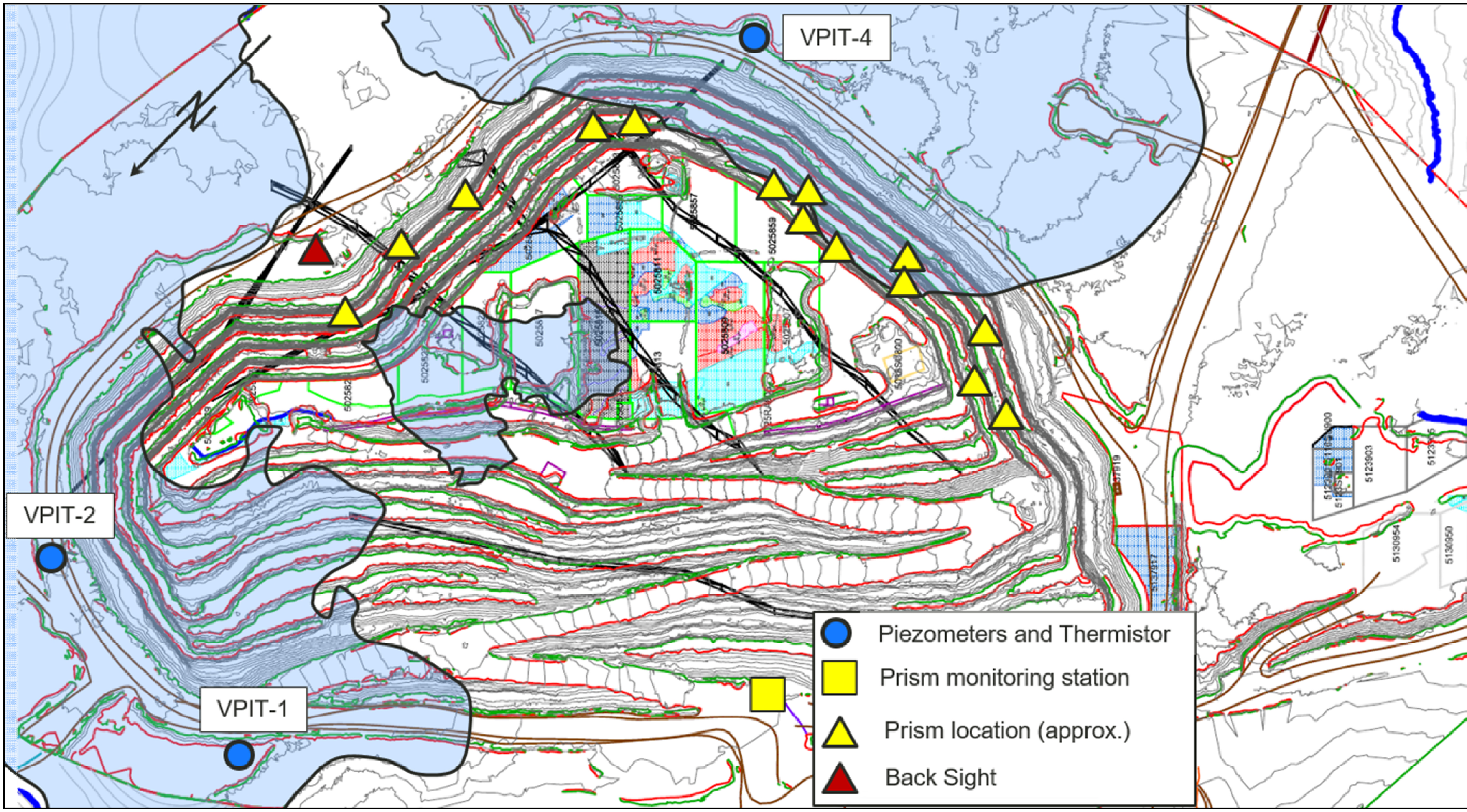
Goose Pit Piezometer Data GPIT-20

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00
OFFICE	DATE			
VANCOUVER	DECEMBER, 2017			

Figure B-19

APPENDIX C

VAULT PIT INSTRUMENTATION DATA



LEGEND

Former Lake

NOTES

Data provided by Agnico Eagle Mines Ltd. Locations are approximate.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE
MEADOWBANK

TETRA TECH

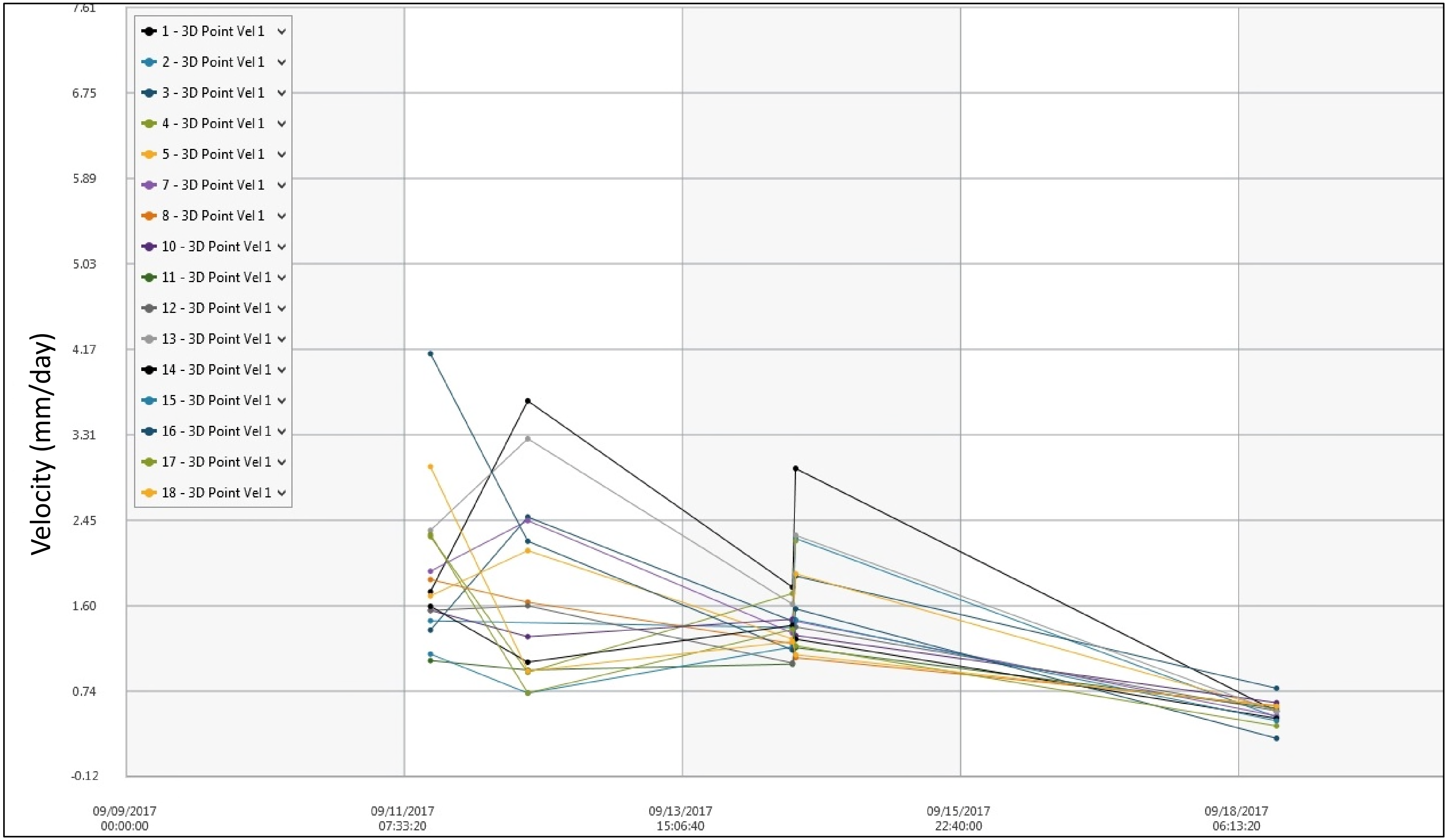
MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Vault Pit
Prism and Instrumentation Plan

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure C-1



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE
MEADOWBANK

TETRA TECH

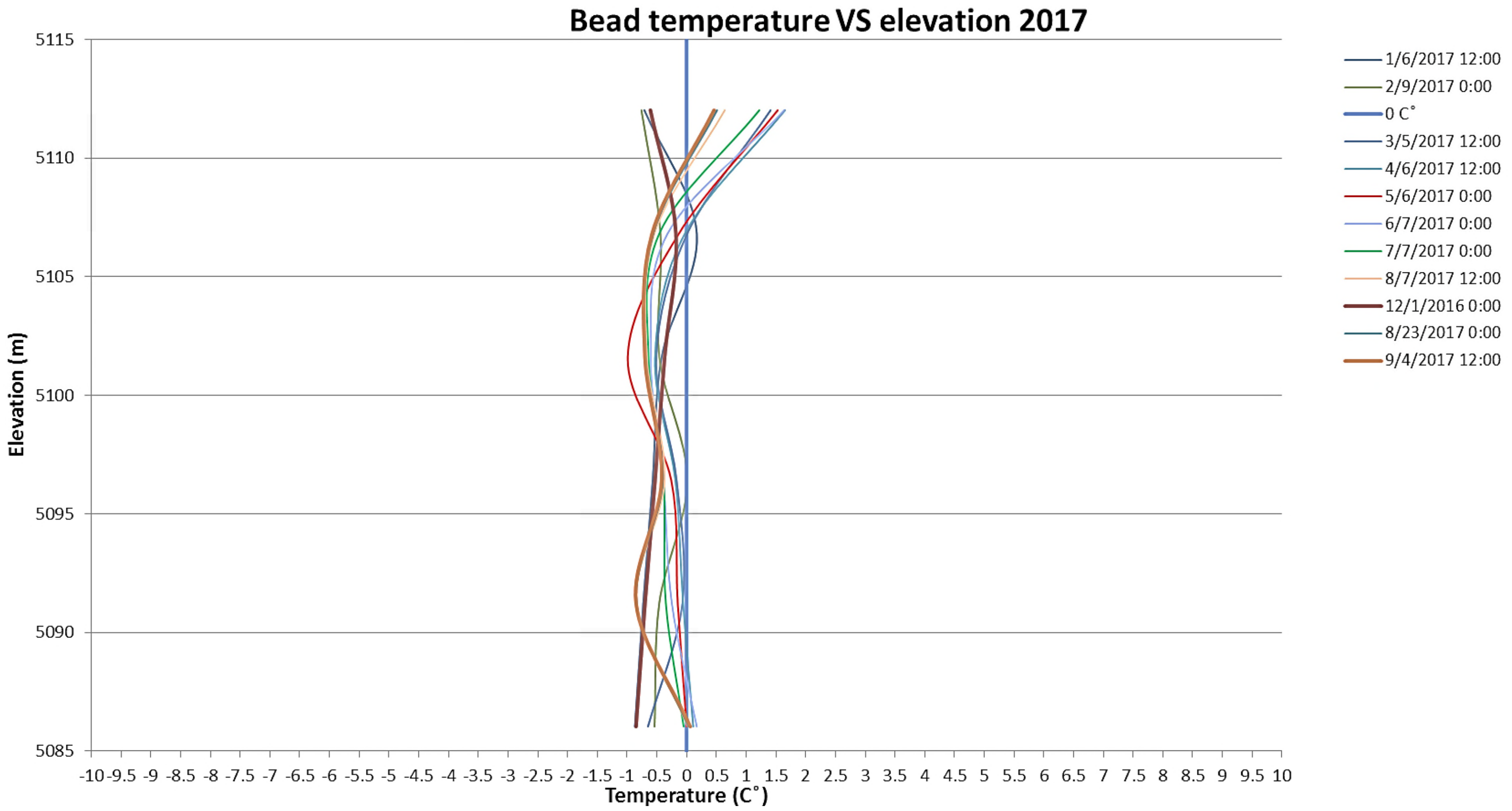
MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Vault Pit
Prism Data Plot

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure C-2



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

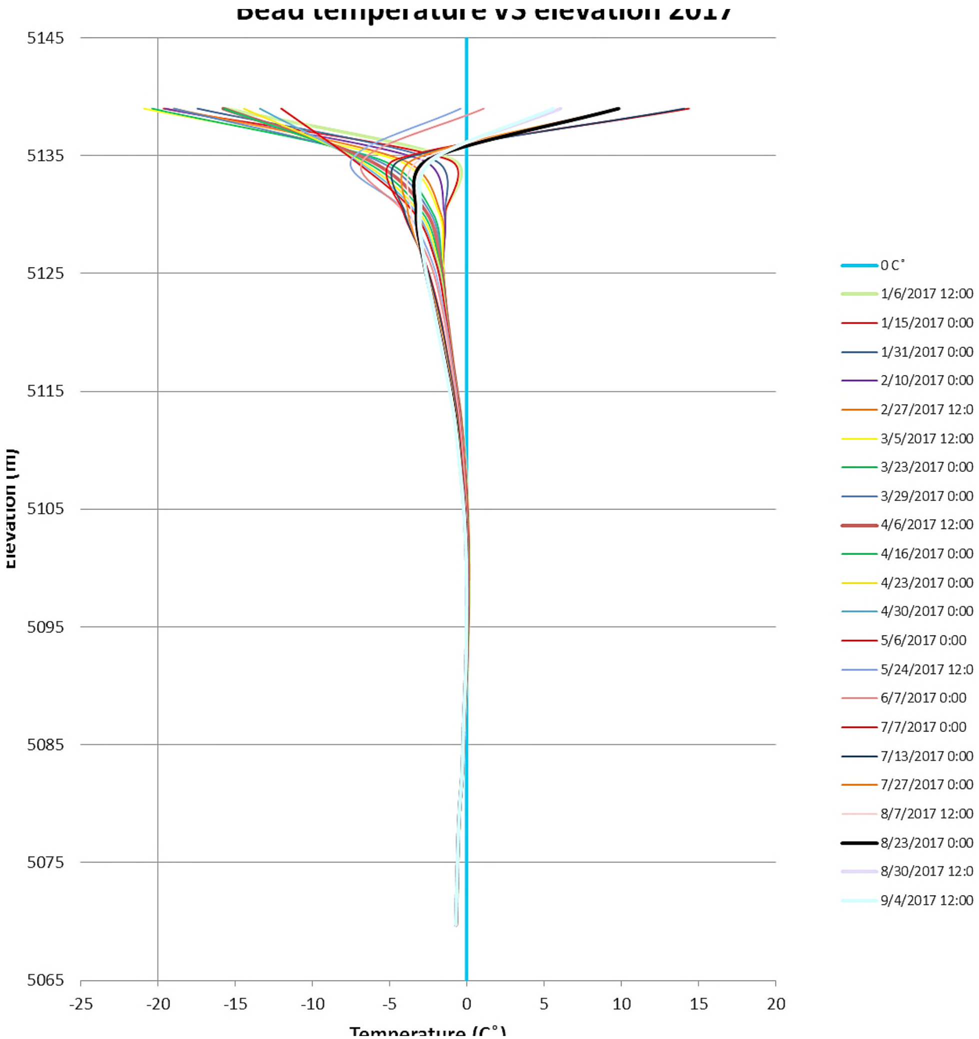
MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Vault Pit
Thermistor Cable VP1 – TH1

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure C-3



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

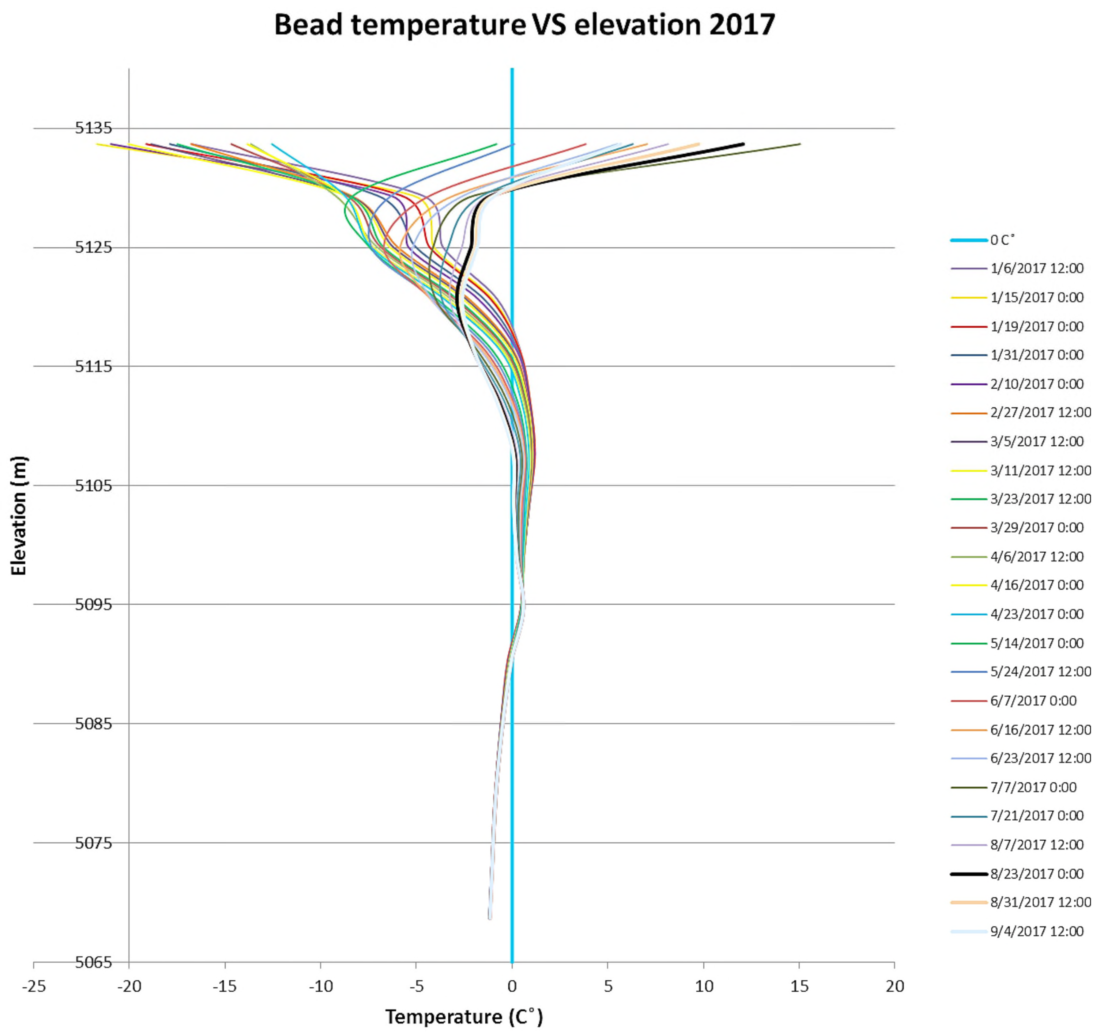
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Vault Pit Thermistor Cable VP2 – TH1

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure C-4



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

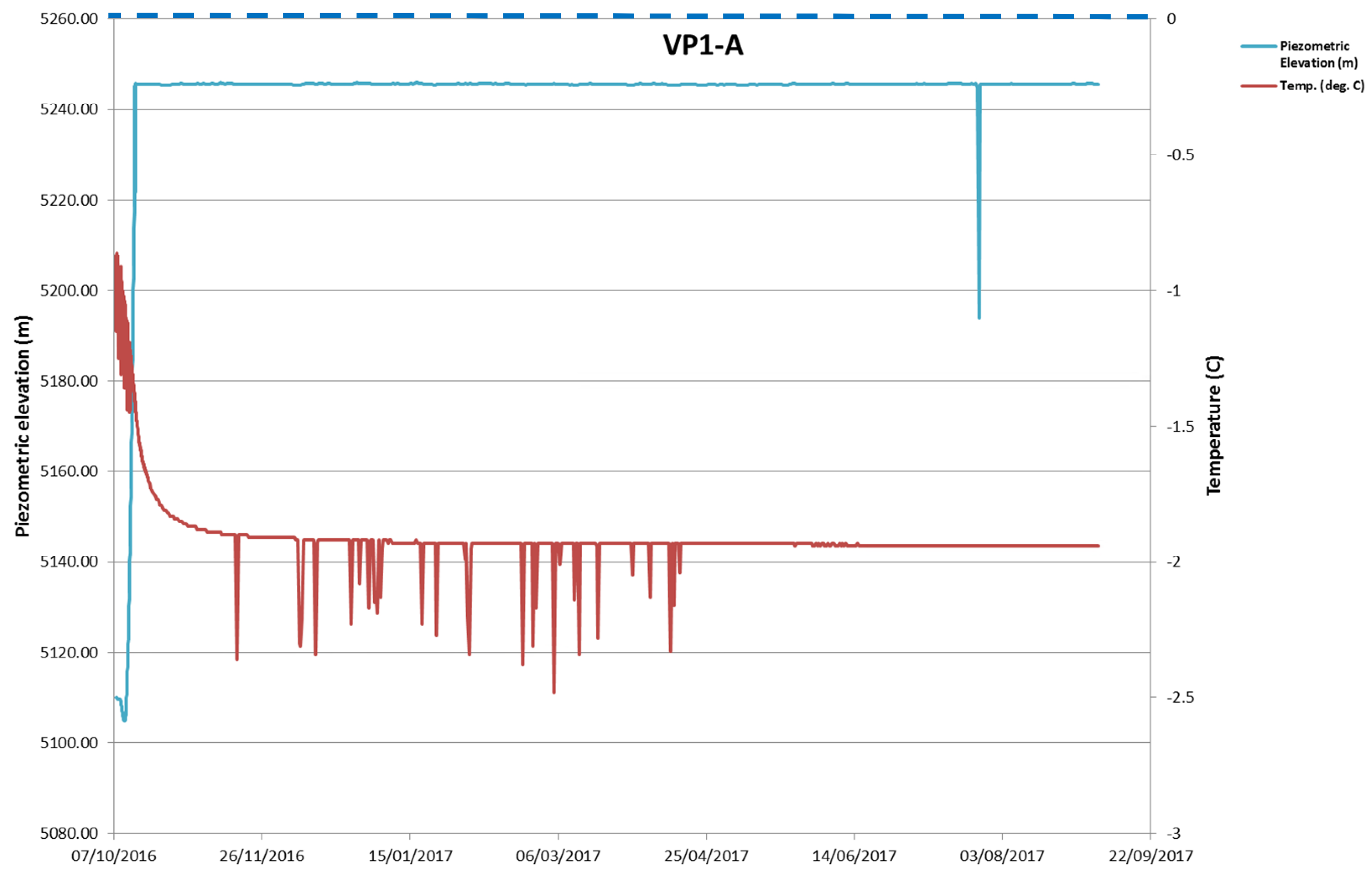
MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Vault Pit
Thermistor Cable VP4 – TH1

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure C-5



LEGEND

Piezometer frozen

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

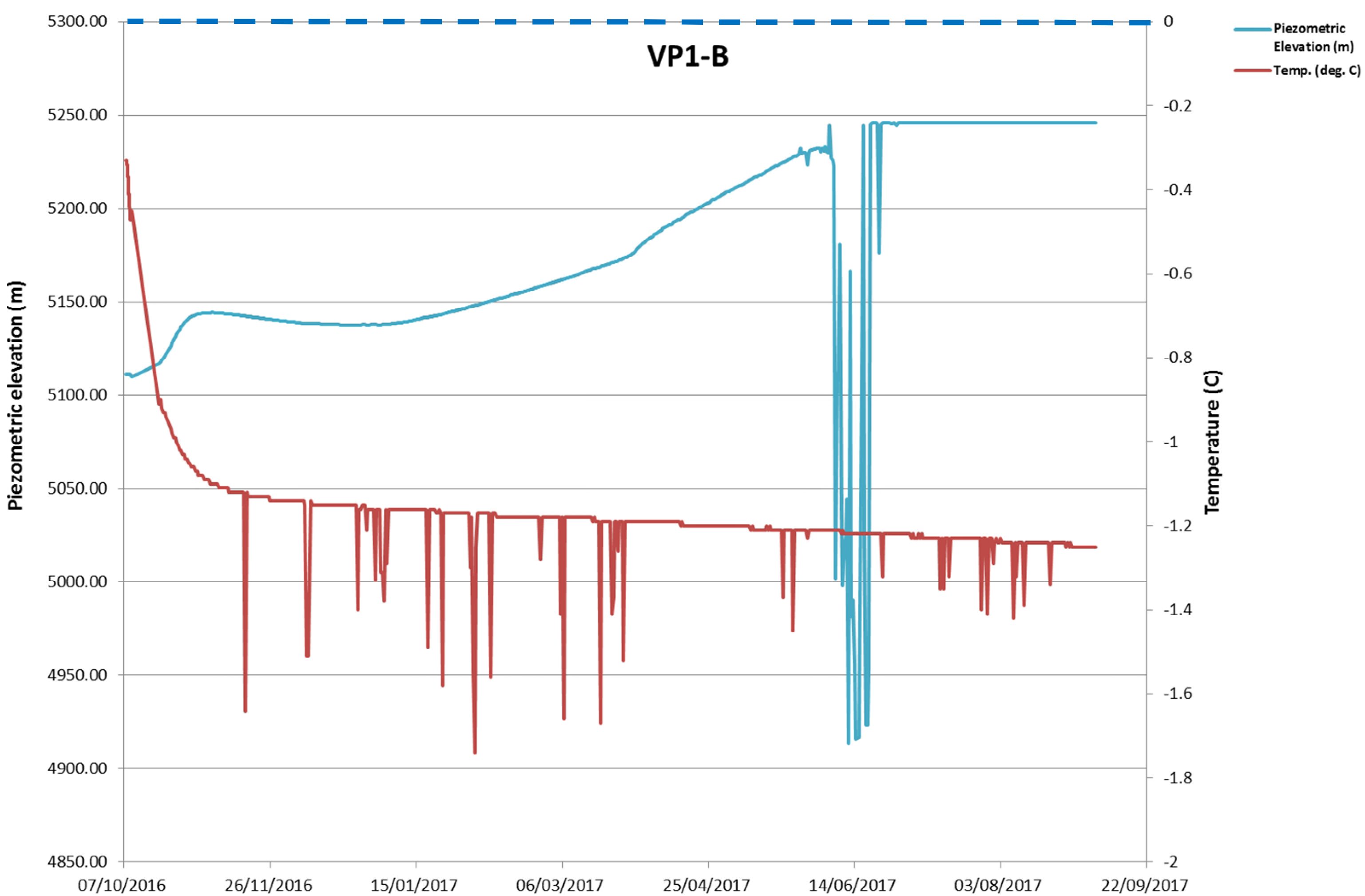
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Vault Pit Piezometer Data VP1-A

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure C-6



LEGEND

Piezometer frozen

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

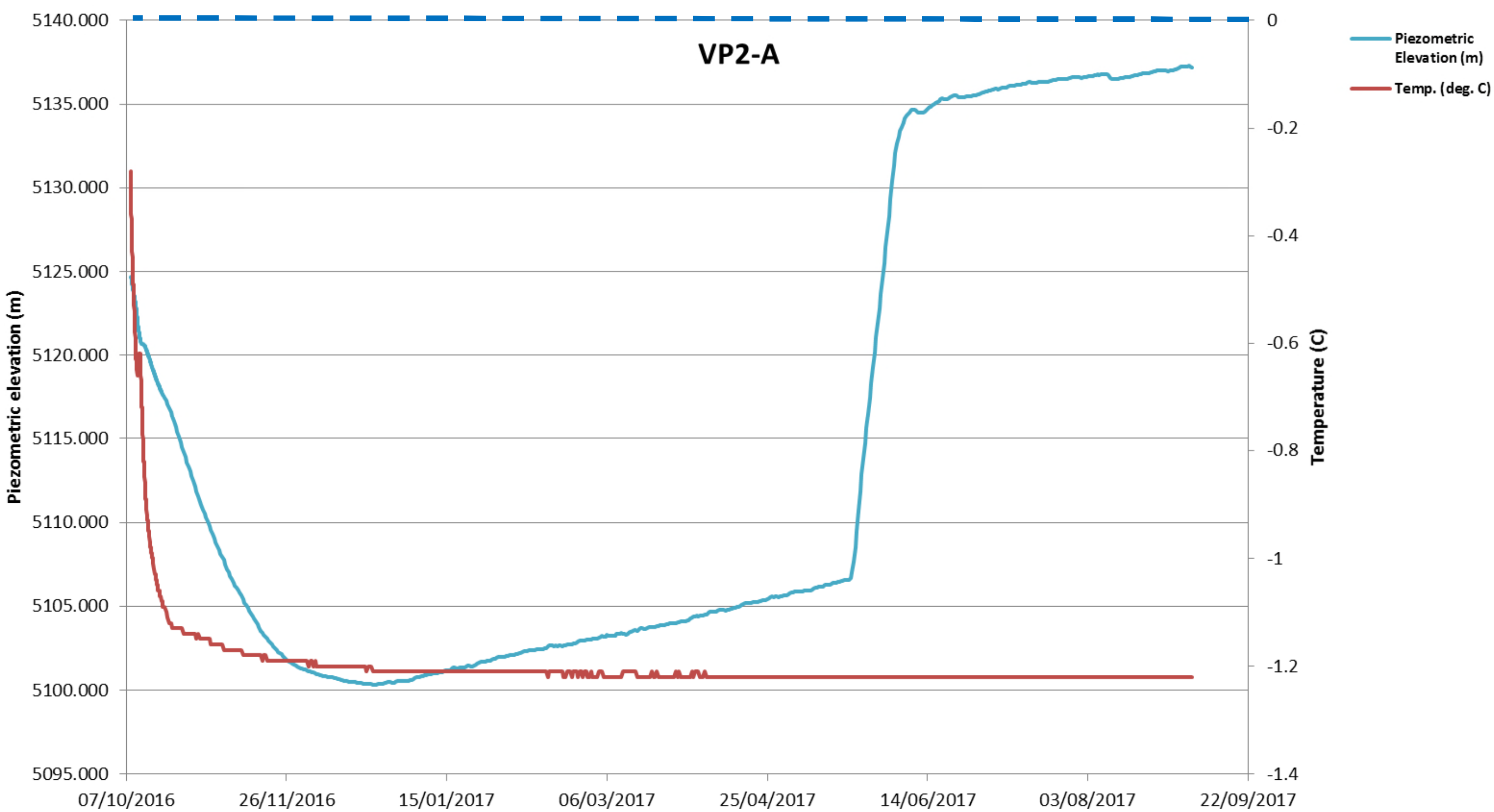
TETRA TECH

MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Vault Pit
Piezometer Data VP1-B

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00
OFFICE	DATE			
VANCOUVER	DECEMBER, 2017			

Figure C-7



LEGEND

Piezometer frozen

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

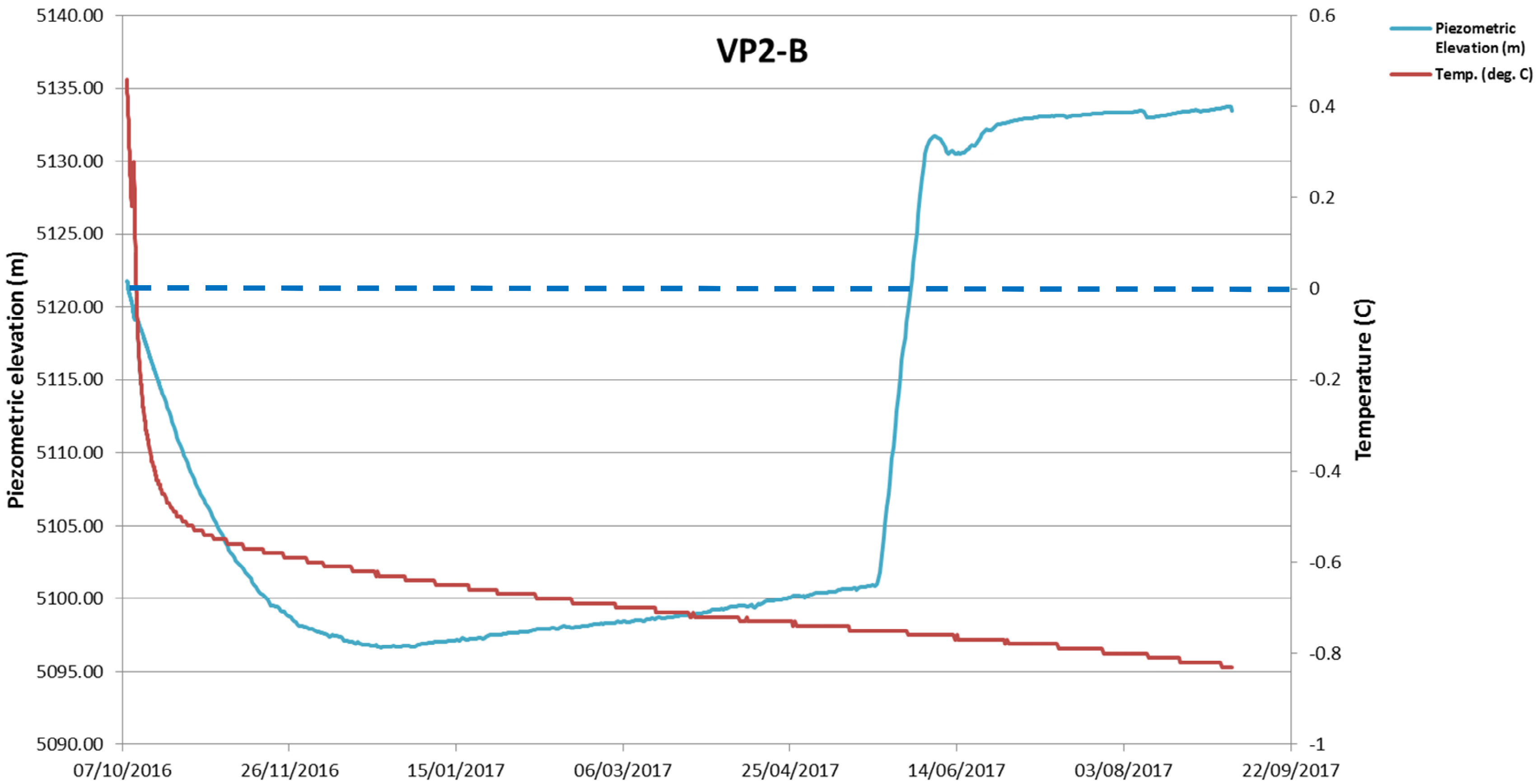
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Vault Pit
Piezometer Data VP2-A

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure C-8



LEGEND

Piezometer frozen

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

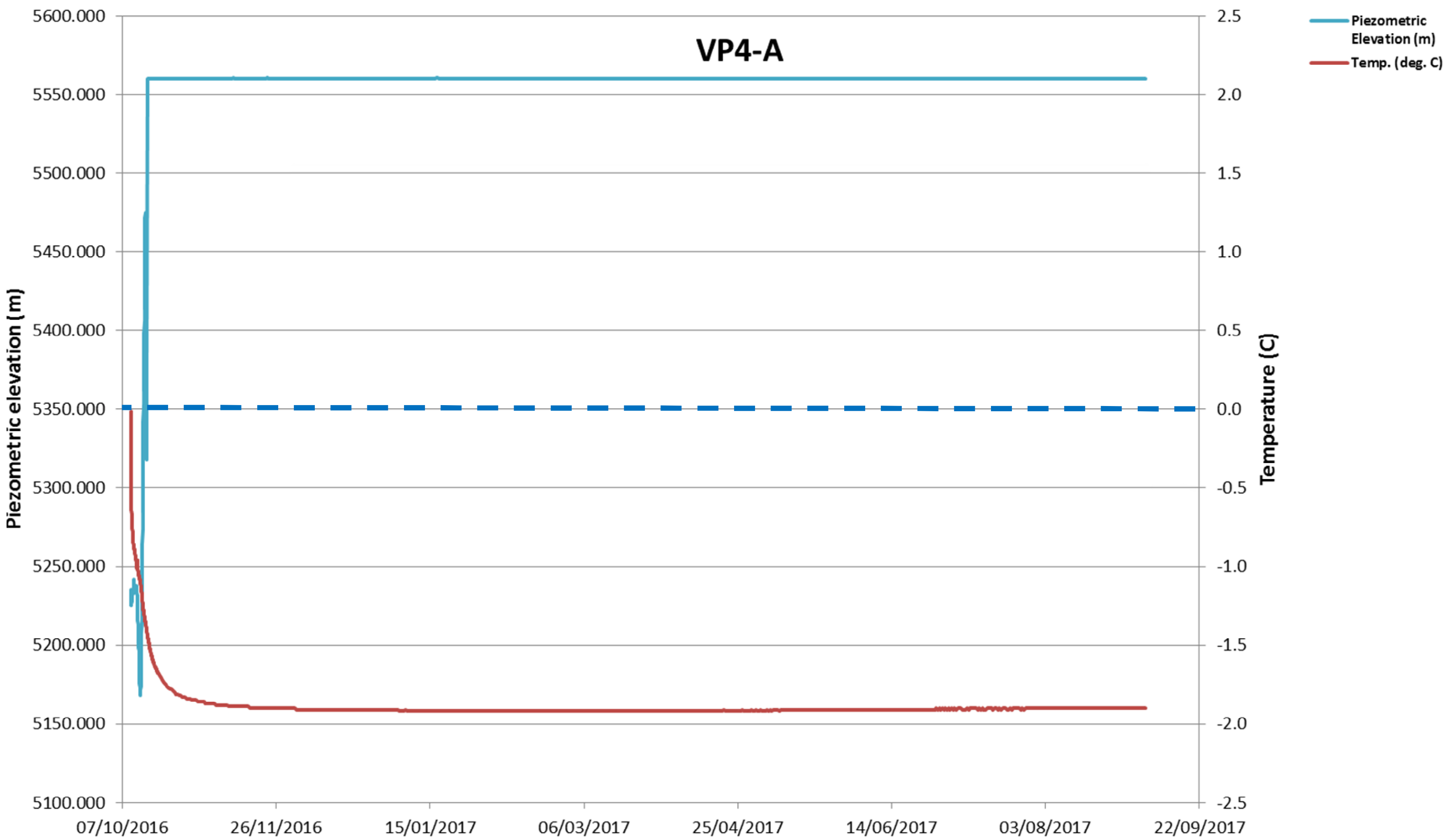
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Vault Pit Piezometer Data VP2-B

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure C-9



LEGEND

Piezometer frozen

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

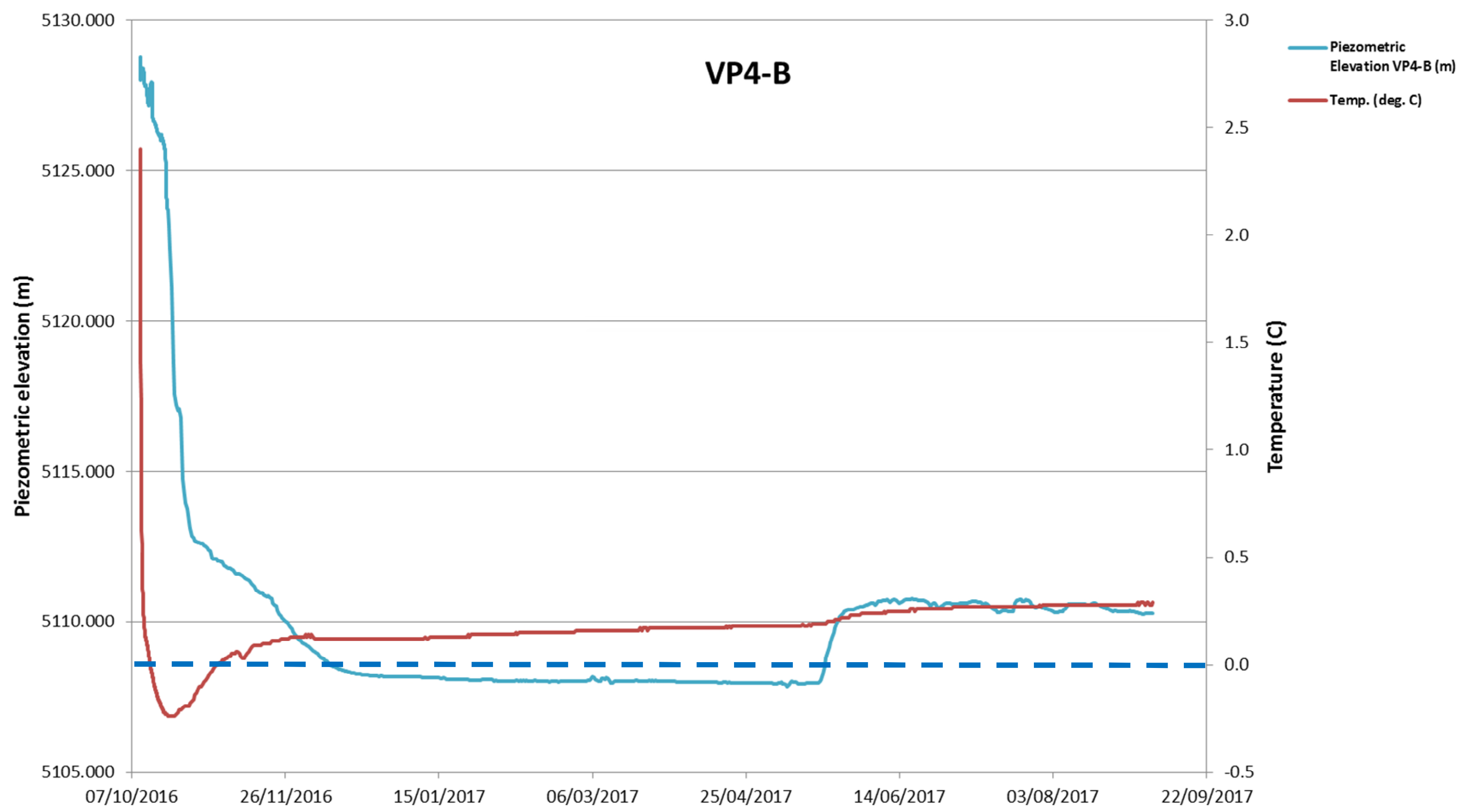
MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Vault Pit Piezometer Data VP4-A

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure C-10



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS
ISSUED FOR USE

CLIENT
AGNICO EAGLE MEADOWBANK

TETRA TECH

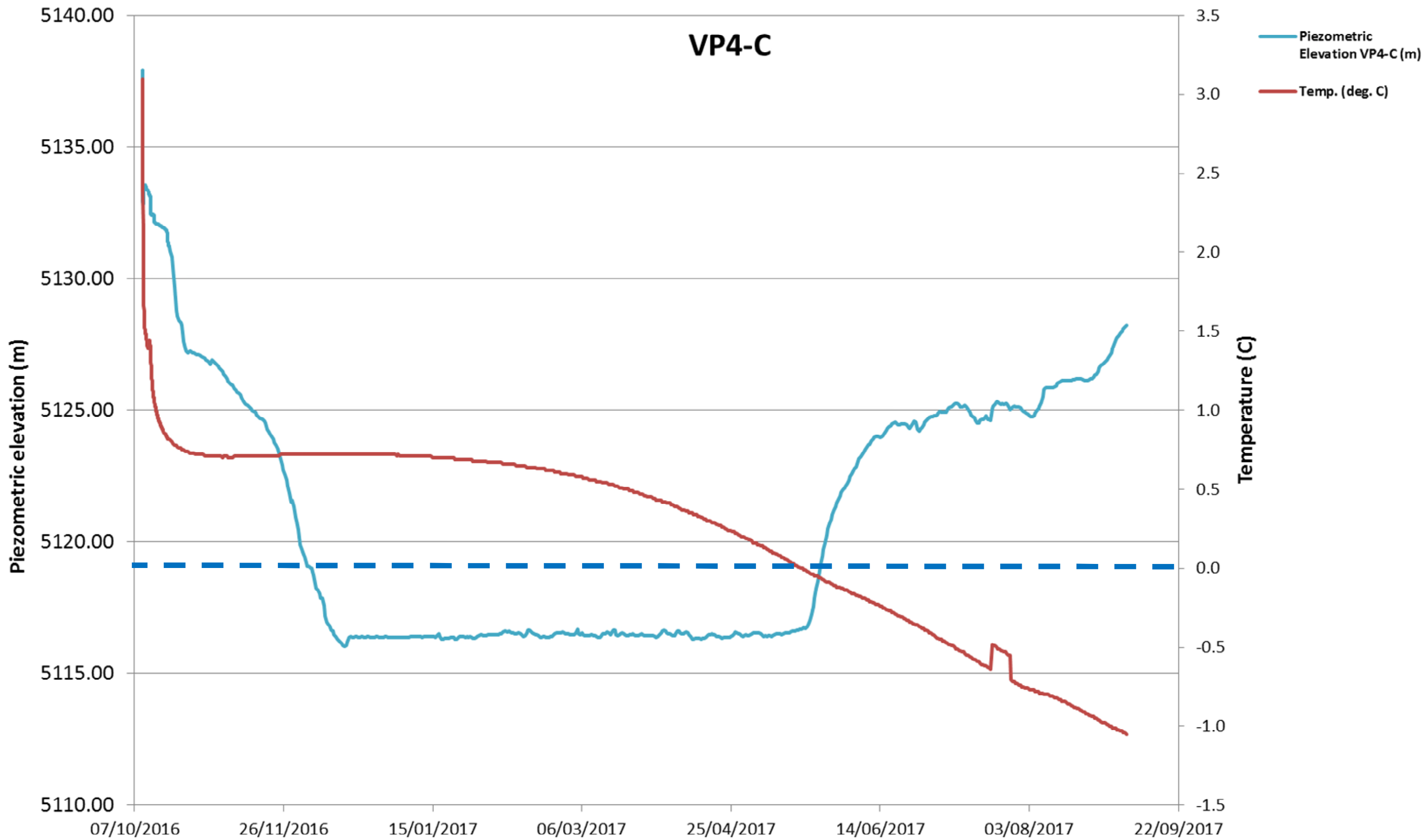
MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Vault Pit
Piezometer Data VP4-B

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure C-11



LEGEND

Piezometer moves from unfrozen to frozen state

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

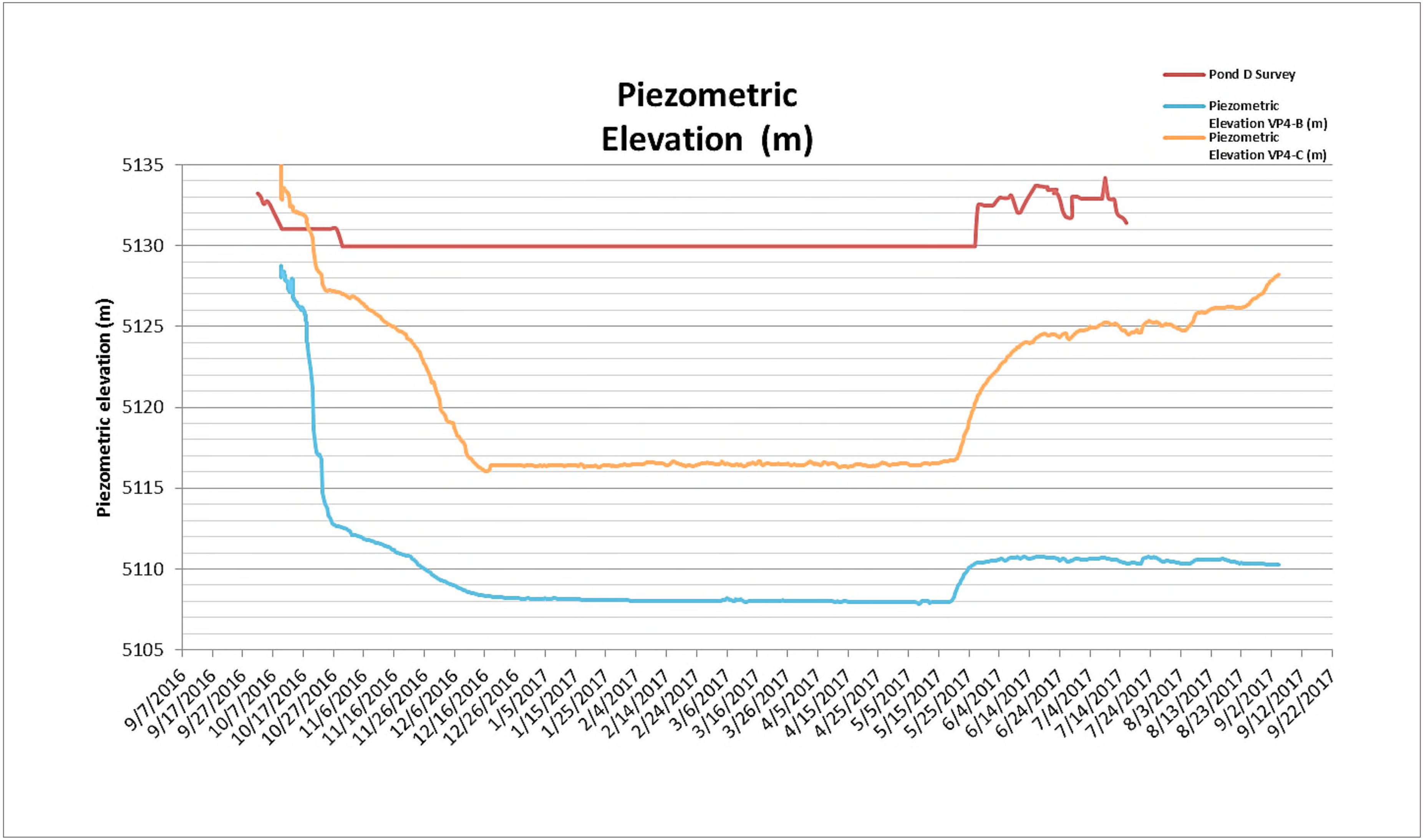
MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Vault Pit
Piezometer Data VP4-C

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure C-12



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Vault Pit
Pond D, VP4-B and VP4-C Survey Data

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure C-13

APPENDIX D

PHASER PIT DESIGN REVIEW

TETRA TECH

OQM CERTIFIED

November 21, 2017

ISSUED FOR USE
FILE: ENG.ROCK03061-01
Via Email: pierre.mcmullen@agnicoeagle.com

Agnico Eagle Mines Ltd.
Meadowbank Division
10 200, Route Preissac
Rouyn-Noranda QC J0Y 1C0

Attention: Pierre McMullen – Engineering Superintendent

Subject: Review of Phaser Pit and BB Phaser Pit Proposed Design

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was requested by Agnico Eagle Mines Ltd. (Agnico) to provide a review of the pit slope design criteria used by Agnico for the Phaser Pit and BB Phaser Pit at the Meadowbank Gold Mine. The two pits are southward extensions of the existing Vault Pit, which is currently being mined. The request was received from Agnico by email on 09 September 2017.

The conclusions presented at the end of this letter report are related to the proposed pushback of the south wall of the Vault Pit to form the Phaser Pit and the BB Phaser Pit, and are based on the following information:

- Personal and directly relevant experience of Mr. Cameron Clayton, P.Eng. P.Geo with the Meadowbank Project for 22 years, including drilling and logging of geotechnical boreholes at the Vault Deposit area in 2002, and subsequent analysis and design to develop the initial (2003) and optimized (2013) Vault pit slope design criteria;
- A site visit to the Vault Pit, Phaser Pit (initial stripping) and BB Phaser Pit (construction pending) in September 2017 as part of annual pit slope performance inspections for the Meadowbank Mine;
- A review of available reports, including the following:
  - Golder Associates Ltd. 2004. Vault Pit Slope Design Criteria. Technical Memorandum, January 9, 2004.
  - Golder Associates Ltd. 2013. Factual Report on Meadowbank Vault Pit Geotechnical Field Investigation. June 7, 2013.
  - Golder Associates Ltd. 2013. Optimization of Vault Pit Slope Design Criteria. October 1, 2013.
  - Golder Associates Ltd. 2014. Annual Review of Portage, Goose, and Vault Pit Slope Performance (2014) – Meadowbank Mine. November 2014.
  - CJ Clayton Mine Geotechnical Services Ltd. 2015. Annual Review of Pit Slope Performance (2015) – Meadowbank Mine. November 2015.
  - Tetra Tech Canada Inc. 2016. Annual Review of Pit Slope Performance (2016) – Meadowbank Mine. November 2016.
- A review of Agnico's rock fall log entries for the Vault Pit.

- A review of a back break assessment for the Vault Pit completed in 2017, to assess the general bench performance relative to original designs and back break estimates.
- A review of preliminary LiDAR scan data and data interpretation of structural orientations, carried out by Agnico site personnel and completed in October 2017.
- A review of Agnico's proposed push-back design for the Phaser Pit and BB Phaser Pit, including a general cross section through each pit.
- A review of bathymetric data from the former Phaser Lake, considered in the context of possible permafrost extents and potential for talik formation and talik water inflows.

2.0 DESCRIPTION OF PROPOSED PUSHBACK

The Meadowbank Mine consists of several open pit operations in close proximity to one another (see Figure 1 and Figure 2). Currently, the Portage Deposit and the Vault Deposit are being mined. The Portage Pit is located at the south end of the project area, while the Vault Pit is located at the north end of the project area.

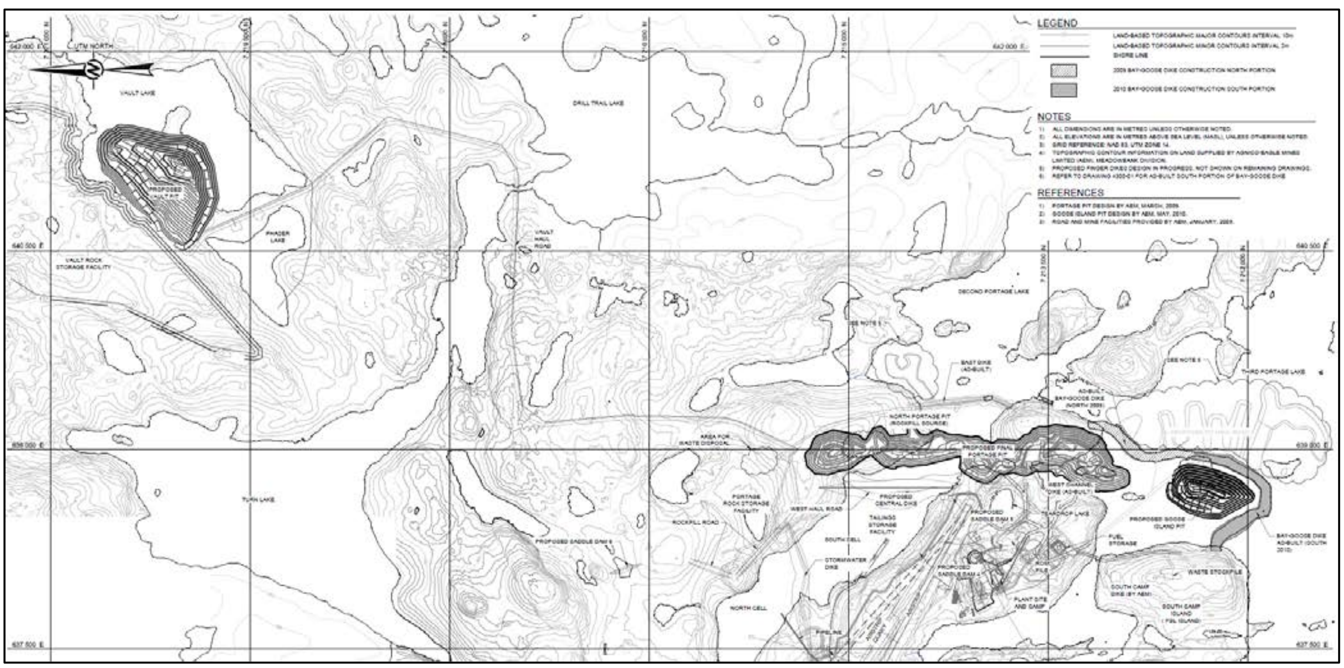


Figure 1: Meadowbank Mine Project (Golder 2013)

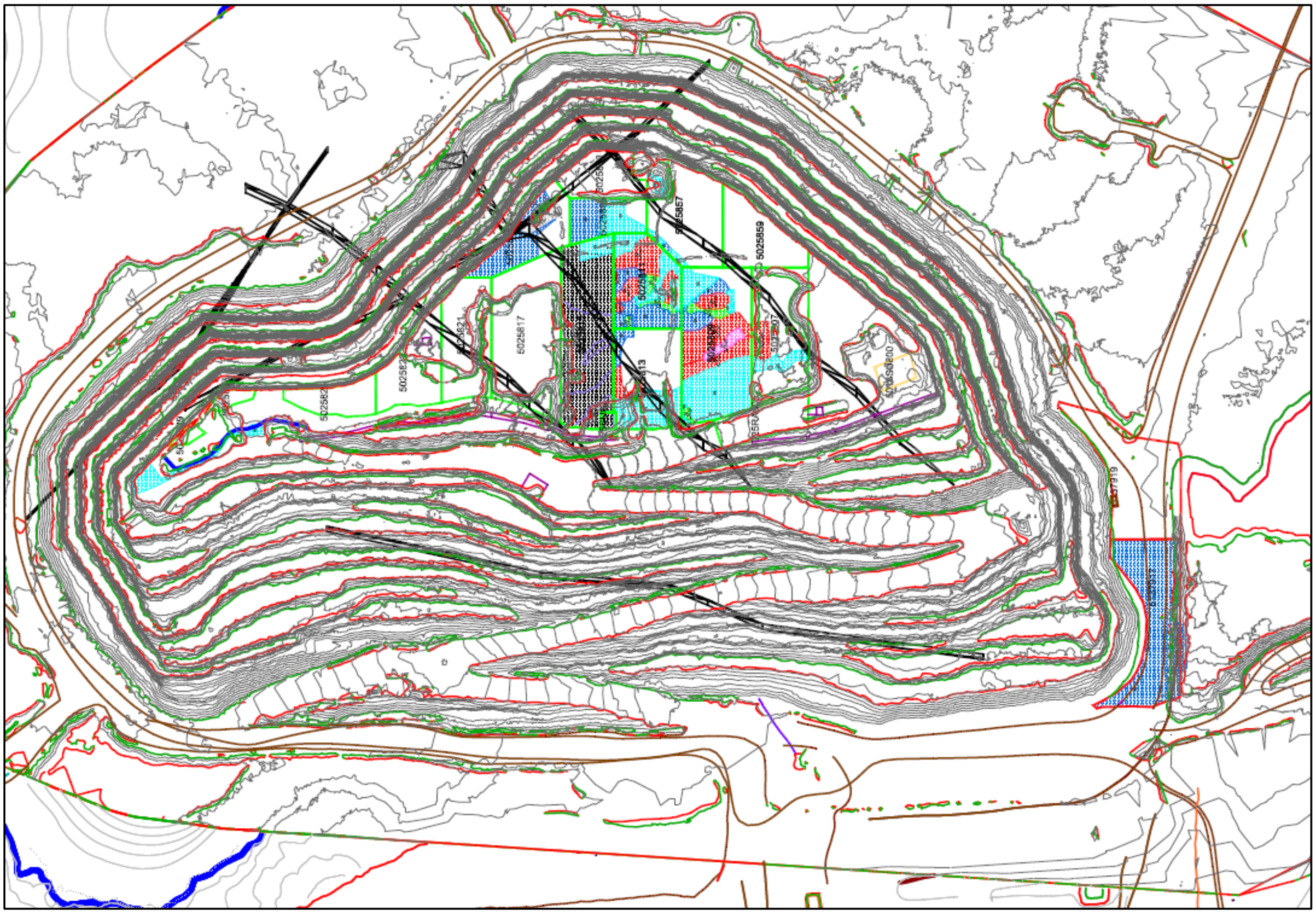


Figure 2: Vault Pit As-Mined 2017

The slope design criteria proposed for the development of the Phaser and BB Phaser Pits are based on the current slope design criteria in use for the Vault Pit. The following table summarizes the proposed slope design criteria:

Table 2-1: Proposed Slope Design Criteria

Slope Component	Dimension
Single Bench Height (m) Footwall Slope	7
Triple Bench Height (m)	21
Bench Width (m)	10.5
BFA (deg)	75
IRA (deg)	51.4
OSA (deg)	52.2

The Phaser Pit will be mined as a pushback of the south wall of the current Vault Pit, into the dewatered Phaser Lake. The general layout for the proposed pushback mining area is shown in Figure 3.

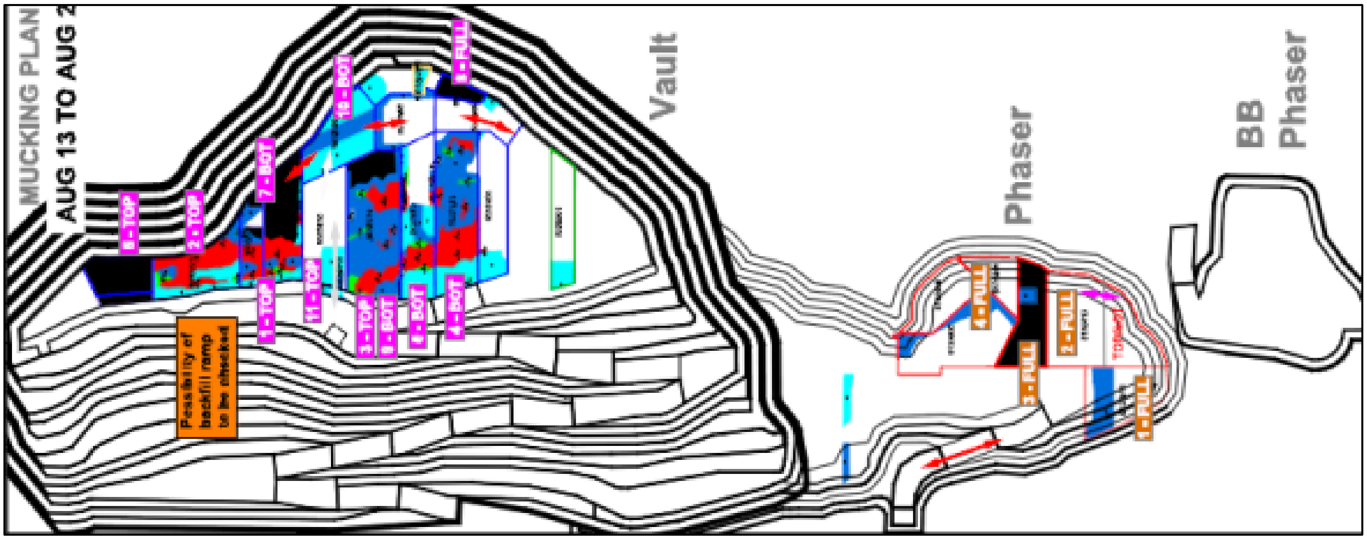


Figure 4: Pushback of Vault South Pit Wall to Phaser and BB Phaser Pits (Source: Agnico Eagle Mines 2017)

2.1 Phaser Pit

Mining of Phaser Pit commenced in 2017. The planned depth of the Phaser Pit will be in the range of 40 to 50 m (2 to 3 benches), not including the overburden at the crest of the pit which is estimated to be in the range of 20 to 25 m deep, based on cross sections provided by Agnico. The west wall (footwall) of the pit will be in permafrost; a portion of the east wall of the pit may be within talik beneath the former Phaser Lake, which reached a maximum depth of about 3 m. Consequently, the talik beneath the lake is not expected to be significant, although some water inflow to the pit of talik water should be expected. It is anticipated this water will be managed using appropriately located sumps and pumps, as is done for the Vault Pit. The pit will be mined over a period of approximately 1 year, from Q3 2017 to Q3 2018. Ice build-up on the walls may occur during winter and may result in increased raveling.

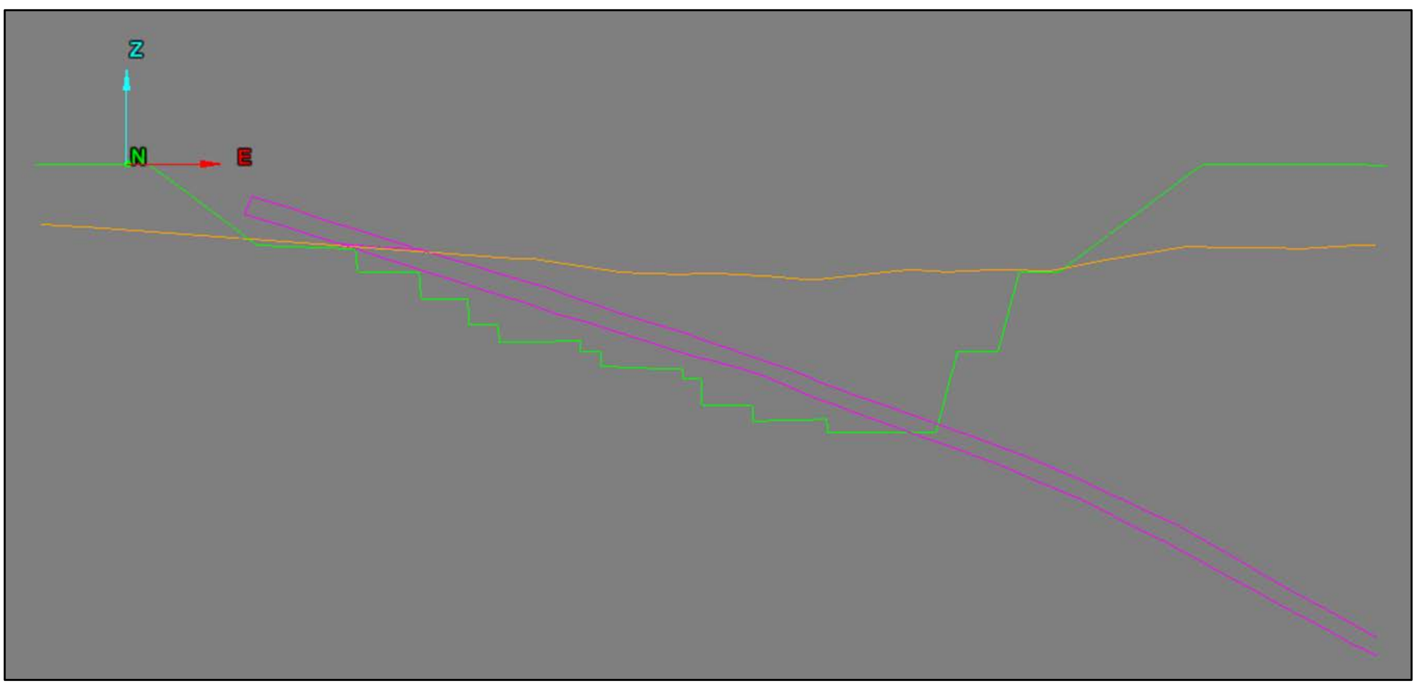


Figure 5: Cross Section through Phaser Pit (Source: Agnico Eagle Mines 2017)

2.2 BB Phaser Pit

The proposed BB Phaser Pit is not currently being mined. It will be approximately 40 to 50 m south of the Phaser Pit. The pit will be excavated entirely within the lakeshore outline of the dewatered Phaser Lake. Based on available lake bathymetry the depth of Phaser Lake underlying BB Phaser Pit footprint is on the order of 1 to 2 m.

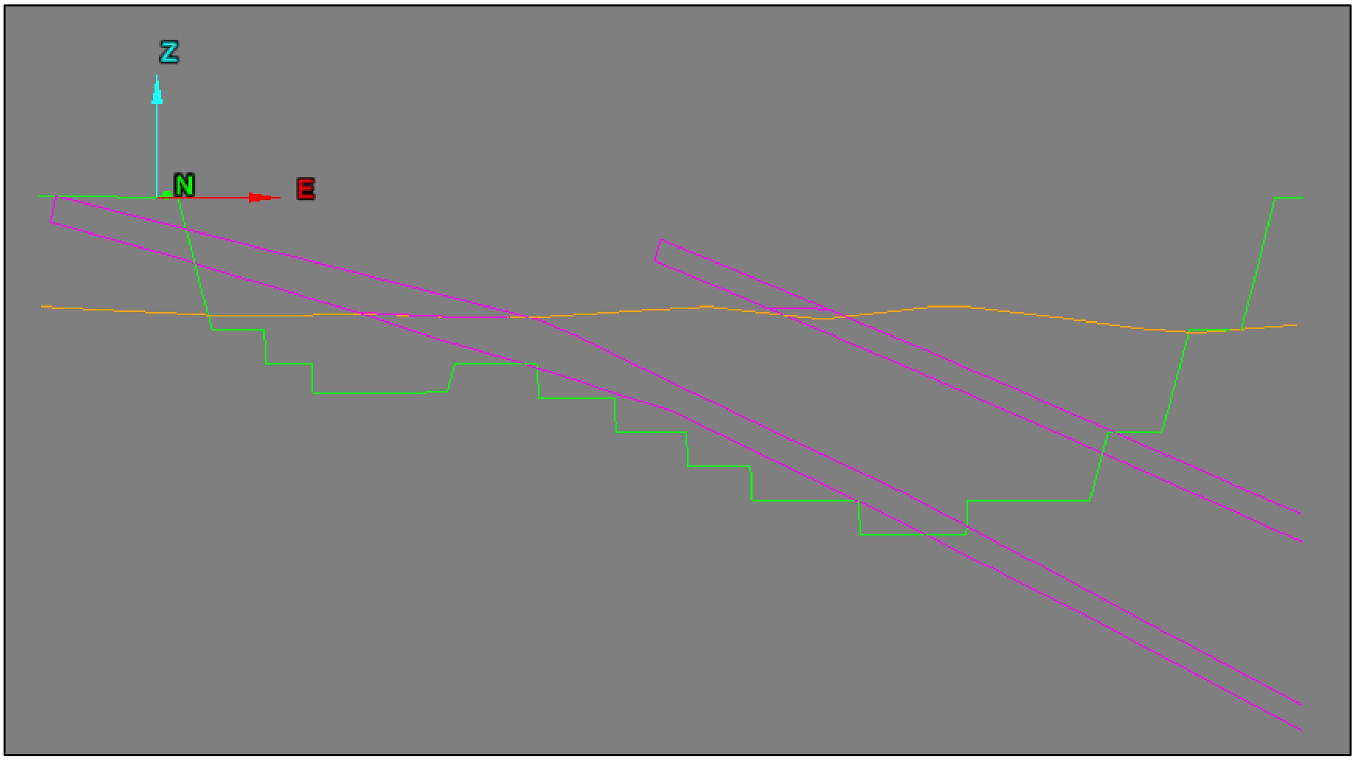


Figure 6: Cross Section through BB Phaser Pit (note, overburden slopes as shown are incorrect, and will sloped back appropriately) (Source: Agnico Eagle Mines 2017)

Consequently, this portion of the lake will have frozen to lake bottom annually, and so the development of a deep talik beneath the lake is expected to be limited. Nevertheless, some inflow to the pit of talik water should be expected. Ice build-up on the walls may occur during winter and may result in increased raveling. It is anticipated this water will be managed using appropriately located sumps and pumps, as is done for the Vault Pit. The planned depth of mining of the BB Phaser Pit will be in the range of 30 to 40 m, not including overburden at the crest of the pit which may be up to 25 to 30 m deep, based on cross sections provided by Agnico. The pit will be mined over a period of approximately 1 year, from Q1 2018 to Q1 2019.

3.0 DATA REVIEW

The Vault Deposit is underlain by a sequence of intermediate volcanic rock that has been altered by sericite, chlorite, and silica. The stratigraphy is inclined to the south to southeast at relative consistent angles of around 30 degrees. The stratigraphy and the foliation are the most significant structural characteristic of the deposit area, with the foliation being relatively continuous while systematic joint sets are generally discontinuous. The stratigraphy and foliation are inclined to the south-southeast between approximately 20 and 40 degrees, although some shallower and some steeper areas are noted.

Agnico mines the ore and waste at the Vault Deposit on 7 m high working benches. A multiple (triple) bench configuration within waste is used for the north, east and south walls with final heights of 21 m. Mining of the ore down the footwall of the deposit is on a single bench configuration to final bench height of 7 m high. Where the foliation and stratigraphy dip greater than about 34 degrees, bench scale planar failures are common on the west footwall.

3.1 Previous Studies and Vault Pit Slope Design Criteria

Golder Associates Ltd. (Golder) has previously presented pit slope design criteria for the Vault Deposit in 2004 (Golder 2004), based on data collected from the drilling of several oriented geotechnical boreholes. In 2013 additional geotechnical field investigations were carried out including geotechnical logging of oriented boreholes, hydrogeologic testing and thermal studies, and laboratory strength testing of materials. A pit slope optimization study was completed by Golder in 2013 based on the additional field investigations (Golder 2013). The study concluded that an opportunity existed to steepen the bench face angles based on the new data, results of stability analyses, and operational experience. The following slope design criteria were presented.

Table 3-1: Summary of Bench Design Configurations for the Vault Pit (Golder 2013)

Bench Design Component	Design Sector and Wall Sector Azimuth						
	1	2	3	4	5	6	7
	250º - 175º	175º - 140º	140º - 060º	060º - 030º	030º - 340º	340º - 290º	290º - 250º
Major Lithology	V91-CS/SL	V91-CS/SL	V91-CS/SL	V91-CS/SL	V91-CS/SL	V91-CS/SL	V91-CS/SL
Final bench height (m)	21 (triple)	21 (triple)	21 (triple)	21 (triple)	7 (transition wall)	7 (single)	7 (transition wall)
Bench face angle (degrees)	75	75	75	75	75	75-90	75
Catch bench width (m)	10	10	10	10	Minimum 8	Minimum 8	Minimum 8
Inter-ramp angle (degrees)	53	53	53	53	Dependent on dip of ore body		

In practice, Agnico adopted slightly more conservative design criteria for the actual mining of the pit, electing to use a 10.5 m catch bench which resulted in a reduced inter-ramp slope angle of 51.4 degrees and overall slope angle of 52.2 degrees.

3.1.1 Bench and Overall Slope Performance of Current Vault Pit

The performance of the current Vault Pit is reviewed as part of annual pit slope inspections carried out for the Meadowbank Mine. The benches and overall pit slope at the Vault pit walls continue to perform well. Final benches are pre-sheared to the design bench face angle, and scaled using equipment. The final benches are cleaned well, and there is very little noticeable accumulation of material on these which is a reflection of generally good bench scale performance.

3.1.2 Rock Mass Rating and Intact Rock Strength

In general, the rock at the Vault Deposit was classified by Golder as ‘Good Quality’ rock according to RMR’76 rock mass classification system, and based on the geotechnical drilling investigations (Golder 2013). This is in agreement with observations of the current pit performance made during annual pit inspections by Golder, CJ Clayton Mine Geotechnical, and Tetra Tech. The exception to this are discrete fault zones which are very widely spaced on the order of 30 to 100 metres, based on previous work by Golder, and on observations made during annual pit slope inspections.

A summary of the Rock Mass Ratings (RMR'76) for the various rock types of the Vault Deposit area is presented below (Golder 2013).

Table 3-2: Summary of RMR'76 Ratings (Golder 2013)

Rock Code	2004 RMR_{76} Ratings[a]			2013 RMR_{76} Ratings			Combined 2004 and 2013 RMR_{76} Ratings		
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
I1	N/A	N/A	N/A	52	87	80	52	87	80
IF	50	67	61	62	84	72	50	84	70
V9A	N/A	N/A	N/A	51	82	70	51	82	70
V91-CS	39	82	63	45	87	73	39	87	69
V91-SL	52	87	68	59	92	75	52	92	74
FZ	36	44	41	N/A	N/A	N/A	36	44	41

(a) 2004 RMR_{76} values do not contain data from GT03-VLT-04
(b) N/A – Not Available

A summary of the estimated intact rock strength of the various rock types, based on International Society of Rock Mechanics (ISRM) recommended field strength estimation methods, point load strength testing, and laboratory strength testing is presented below (Golder 2013).

Table 3-3: Summary of Strength Estimates (Golder 2013)

Unit	Field ISRM Strength Estimate [a] (MPa)				Corrected Diametral Point Load Strength (Field Testing) (I_s50) (MPa)			Corrected Axial Point Load Strength (Field Testing) (I_s50) (MPa)			UCS Lab Testing[a] (MPa)			UCS Strength Used for Design (MPa)
	Min	Max	Mean	Mean UCS Corresponding to ISRM Value (MPa)	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
I1[b]	4	6	5	100 to 250	1.3	10.5	5.6	5.9	13.7	10.2	69	140	107	107
IF	4	6	5	100 to 250	2.5	8.7	5.0	5.4	11.8	6.9	137	248	175	175
V9A	3	6	5	100 to 250	4.8	6.6	6.0	7.2	7.2	7.2	N/A[c]	N/A	N/A	94
V9I-CS	2	6	5	100 to 250	0.1	8.3	3.4	0.6	11.3	6.7	51	148	94	94
V9I-SL	3	6	4	50 to 100										94
FZ	1	4	3	25 to 50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	50

(a) Includes data from previous Golder (2004) testing programs and 2013 investigation
(b) Analogous to the quartzite in Golder's 2004 technical memorandum for Cumberland Resources Ltd. No UCS testing completed if on I1 formation in 2013
(c) N/A = Not Available. No UCS testing completed on V9A or FZ lithology. UCS value derived from ISRM hardness value and comparison to other lithologies.

The rocks of the Vault Deposit area are of sufficient strength that bench configurations and overall slope stability are controlled by structural features within the rock mass, rather than by the rock mass strength or induced rock stress.

3.1.3 Vault Pit Main Geologic Structure Based on Drilling (2003 and 2013)

The Vault Deposit area is underlain predominantly by intermediate volcanic rock that has been variably altered by sericite, chlorite, and silica. The most characteristic structural feature at Vault is the foliation that parallels stratigraphy, dipping to the east at angle ranging from about 20 degrees to about 40 degrees. The ore is contained within narrow bands of felsic volcanic rocks, within the greater intermediate volcanic sequence.

The dominant systematic structural orientations that affect pit slope design as well as the current Vault Pit performance are the east dipping foliation, a west dipping orthogonal joint set, and a sub-vertically oriented northwest-southeast trending conjugate joint set. The orthogonal joint set and the conjugate joint set are systematic structural features common to sedimentary or layered type deposits. The geometric relationship between the foliation/stratigraphy, and the two sets, is generally preserved. This means as bedding becomes steeper, the perpendicular set becomes shallower, and as bedding becomes shallower the perpendicular set becomes steeper.

The bench face angles of the east highwall are designed according to the orientation of the orthogonal set, to minimize undercutting of the set. The orientation of the set is consistently perpendicular to the foliation/stratigraphy, and triple bench configurations to 21 m high are consistently achieved in the Vault Pit. The benches are pre-sheared to a defined angle close to the average dip of the joint set. The bench scale stability of west low wall (footwall) slope is controlled by the consistently east dipping stratigraphy, and are designed accordingly as single-benches.

In addition to the main foliation and orthogonal joints sets, other subordinate sets are present, but sufficiently widely spaced and discontinuous so as not to contribute significantly to excessive raveling of material. The following table summarizes the general orientations of the Vault Deposit area from the 2013 optimization study. These are based on oriented core data collection in 2003 and 2013 using the clay imprint method.

Table 3-4: Main Structural Orientations of the Vault Deposit Area (Golder 2013)

Discontinuity Type	Dip/Dip Direction 2004 (Degrees)	Dip/Dip Direction 2013 (Degrees)	Dip/Dip Direction Combined 2004 and 2013 (Degrees)	Continuity (Assumed)
Foliation (FOL)	23/143	22/148	22/146	Continuous
Orthogonal joint set (OJ)	64/334	64/327	65/335	Discontinuous
Conjugate Joint 1 (S/SW Dip) (CJ1)	83/201	84/216	84/213	Discontinuous
Conjugate Joint 2 (NE Dip) (CJ2)	83/040	80/049	82/047	Discontinuous
South-dipping fault parallel joints (FP1)	44/181	33/158	34/163	Discontinuous
East-dipping fault parallel joints (FP2)	69/102	N/A (a)	79/100	Discontinuous
Southwest-dipping joints (J1)	N/A(c)	68/190	67/191	Discontinuous
Shallow northwest-dipping joints (J2)	N/A(c)	15/048	15/045	Discontinuous
North-south faults (SD FLT)	70/090	N/A (b)	70/090	Continuous
East-west faults (ED FLT)	55/180	N/A (b)	55/180	Continuous

(a) Data collected for this joint set was limited and variable in 2013 due to the orientation of the boreholes
(b) Fault locations and orientations are as provided in mapping by Cumberland resources in 2004, and not confirmed.
(c) Joint set not identified in 2004

The above orientations are summarized on the following stereonet which represents the general structure of the Vault Deposit area.

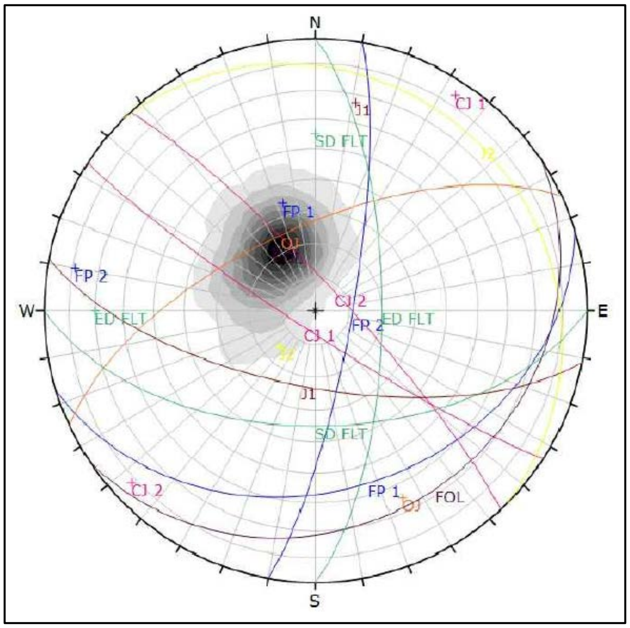


Figure 7: Vault Pit Main Structural Orientations of the Vault Deposit Area Based on Oriented Drilling (Golder 2013)

3.1.4 Vault Pit Main Geologic Structure Based on LiDAR (2013)

In 2013, initial quarrying at the Vault Deposit area commenced to generate rock fill material for construction purposes. A LiDAR survey was completed of the upper fractured rock to assist in validating the general structural interpretation, and the data were interpreted using MapTek I-Site software. The following stereonet represents the the interpreted data from the LiDAR survey.

The main structures mapped from the Vault Quarry East Wall using the I-Site software are consistent with the general structural model for the presence of the systematic south-southeast dipping foliation, north-northwest dipping orthogonal joint set, and northwest-southeast trending conjugate joint set.

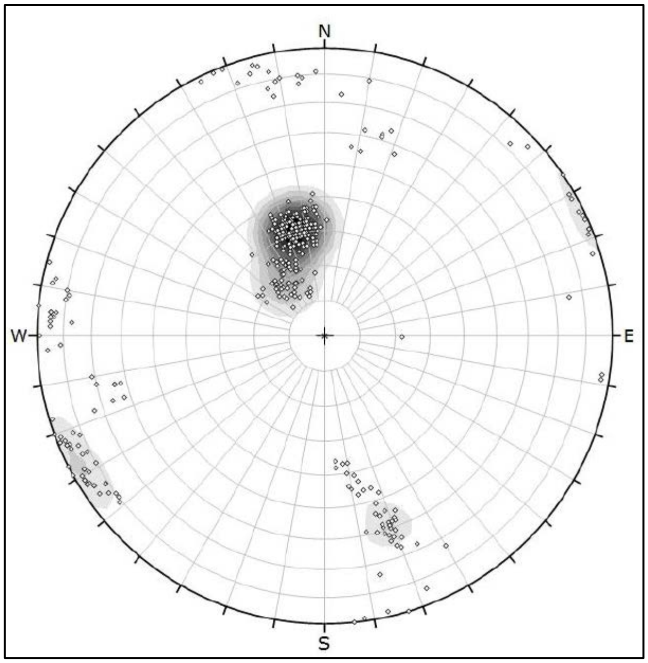


Figure 8: Vault Pit Main Structural Orientations from LiDAR Scan of Vault Quarry East Wall (Agnico 2013)

3.1.5 Vault Pit Main Geologic Structure from In-Pit Mapping (2014)

In 2014, during the first inspection of the Vault Pit area, preliminary geological mapping was carried out to confirm the general structural orientations and trends on which the pit slope design criteria had been developed from the drilling of oriented geotechnical holes. The following stereonet represents the interpretation of the data collected using a mapping compass.

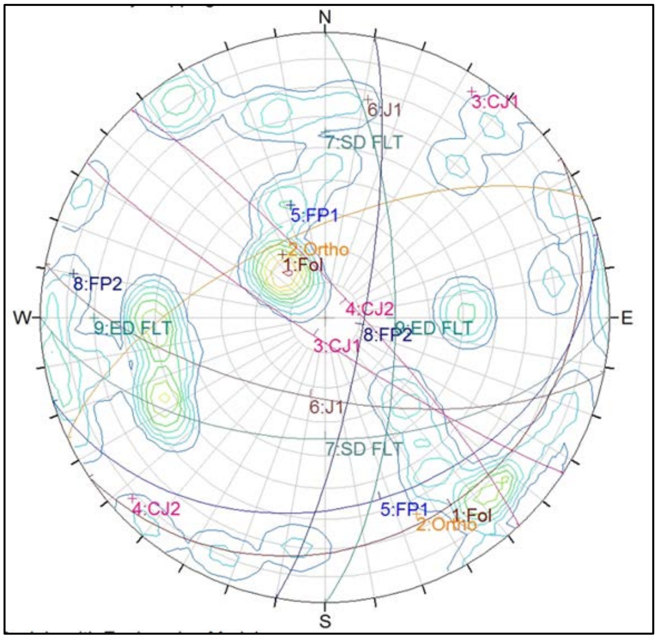


Figure 9: Vault Pit Main Structural Orientations from In-Pit Mapping (Golder 2014)

The results of the in-pit mapping show that the general orientations of the main systematic features are consistent with the orientations used for the development of the slope design criteria for the Vault Pit in 2003, and the optimized slope design criteria in 2013.

3.1.6 Phaser Pit Main Geologic Structure from LiDAR Survey (2017)

Similar to the LiDAR survey carried out in 2013 for the Vault East Wall Quarry, a LiDAR survey was carried out in 2017 during the initial stripping at the Phaser Pit pushback. This initial stripping and excavation exposed the fractured near surface bedrock. The objective of the scan was to allow an initial interpretation of the geological structure exposed in the pit, and compare these data with the known engineering geological model for the main Vault Pit to confirm the consistency and continuity of structure orientations that will be exposed by the pushback. Blast damage of the bedrock, the near surface bedrock condition due to annual freeze/thaw processes, and the limited exposure of bedrock make it difficult to obtain high quality imagery and broad data coverage. Nevertheless, identification of the general trends of the systematic geological structure is possible.

The data collected from the LiDAR scan were processed and interpreted by Agnico using the MapTek software, and the data were provided to Tetra Tech. The following stereonet presents the data collected using the LiDAR scanner, and interpreted by Agnico using the MapTek I-Site software.

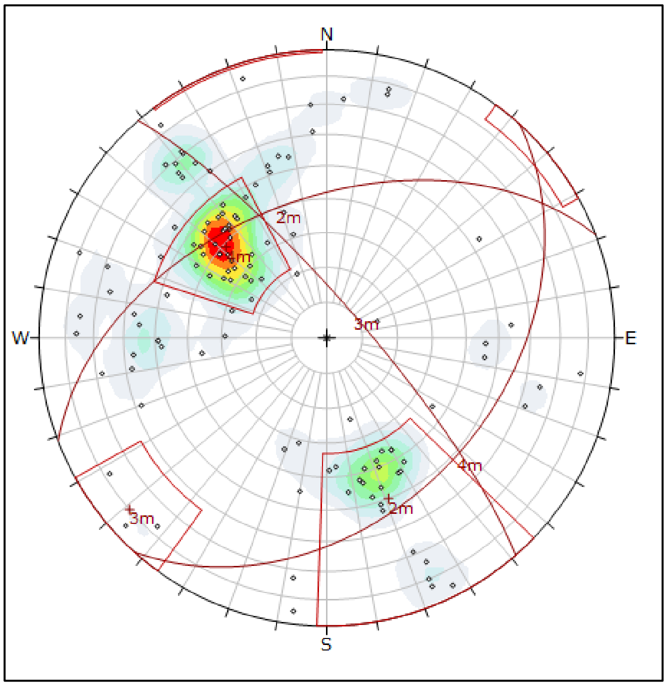


Figure 10: Phaser Pit Main Structural Orientations from LiDAR (Agnico 2017)

The results of the interpreted LiDAR scan show that the general orientations of the main systematic features (south-southeast dipping foliation, northwest dipping orthogonal set, and northeast-southwest trending conjugate set) are consistent with the orientations used for the development of the Vault Pit slope design criteria in 2004, and the optimized slope design criteria in 2013. The orientations are also generally consistent with the subsequent and confirmatory mapping efforts in 2013 and 2014. Therefore, it is a reasonable assumption that the main structural orientations influencing the design and actual mining of the main Vault Pit are applicable to the Phaser and BB Phaser Pit push back.

3.1.7 Permafrost and Groundwater

The Vault Pit has been developed almost exclusively within permafrost, with the exception of portions of the pit wall which extend out into the dewatered portions of existing lakes. One area of constant water inflow to the pit occurs in the upper benches of the southeast wall. The potential for inflows in this area was identified during the optimization design study by Golder (2013), as the wall in this area is pushed back into the talik beneath Vault Lake. The constant water flow results in the formation of an ice wall in this area on an annual basis, and Agnico manage this through the appropriate use of access restriction during critical times of the year.

As described above, the east wall of the Phaser Pit, and the entire BB Phaser Pit will be developed within the dewatered Phaser Lake. Phaser Lake is a relatively shallow, with maximum depth generally on the order of 2 to 3 m, with local areas up to approximately 8 m, but outside of the proposed mining area. Consequently, much of the areas of Phaser Lake that will be mined are beneath areas of the former lake that have frozen to the bottom annually, and so are underlain by permafrost. In areas of the former lake that were deeper than about 2 m, a talik will have formed. Since the lake depth is relatively shallow, the depth of talik is also expected to be shallow, with a finite storativity of talik water. Inflows to the pit are expected to be manageable using existing and proven methods of sumps and pumps. Groundwater pressures behind the low walls of both the pits are not expected to contribute to any overall slope instability. The presence of water within the active layer of the permafrost however may result in annual freeze/thaw cyclic effects which could contribute to bench scale raveling. However, since the pits will be mined over a period of approximately 1 year, these annual effects are expected to have very limited impact.

4.0 CURRENT VAULT PIT PERFORMANCE

4.1 Annual Pit Inspections

Inspections of the Vault Pit have been carried out since the excavation of the initial east and west wall quarries in 2013. Regular annual inspections at Vault Pit commenced in 2014, as a requirement under the water licensing agreement for the project. The performance of the pit walls in the Vault Pit have been reviewed annually, and this performance has been recorded. The pit walls and overall slopes of the Vault Pit have been observed to perform as anticipated, as documented in the annual pit slope inspection reports. The walls of the proposed pushback of the south wall of the pit to form the Phaser and BB Phaser Pits are expected to perform in a manner consistent with the performance of the Vault Pit.

During the 2017 annual inspection, the initial stripping area at the Phaser Pit was visited. While the majority of the stripping area was within overburden materials, the bedrock areas that were exposed indicated foliation/stratigraphy to be inclined to the south-southeast at relatively shallow to moderately angles, and consistent in orientation with the current pit.

4.2 Rock Fall Logs

As part of Agnico's standard operating procedures, regular geotechnical inspections are carried out for all pits at the Meadowbank Mine. The geotechnical inspections include recording of rock fall events at each of the pits and maintaining a rock fall record. Records have been maintained since January 2015. No significant rock fall events have occurred in the Vault Pit since 2015, and only two events have been recorded, one estimated to be less than 10 tonnes, and one estimated to be approximately 30 tonnes. The following table summarizes the rock fall events at the Vault Pit based on the records provided by Agnico.

Table 4-1: Summary of Rock Fall Records, Vault Pit (Agnico 2017)

Date of Rock fall	Time	Pit	Location	Estimated tonnage	Calculated tonnage (MAPTEK)
6/29/2015	Night	Vault	West Wall	<10	
6/1/2016	12:00	Vault	North		30

The absence of significant rock falls at the Vault Pit is additional confirmation of the generally good performance of the pit walls, and conformance with the original design criteria and performance expectations.

4.3 Back Break Study

A back break assessment was completed by Agnico in 2017 for the Vault Pit. The assessment was completed for 20 wall sections, at locations where the main wall orientation changed direction. The locations of the sections for the back break study are shown on the following figure, with the original pit slope design sectors superimposed.

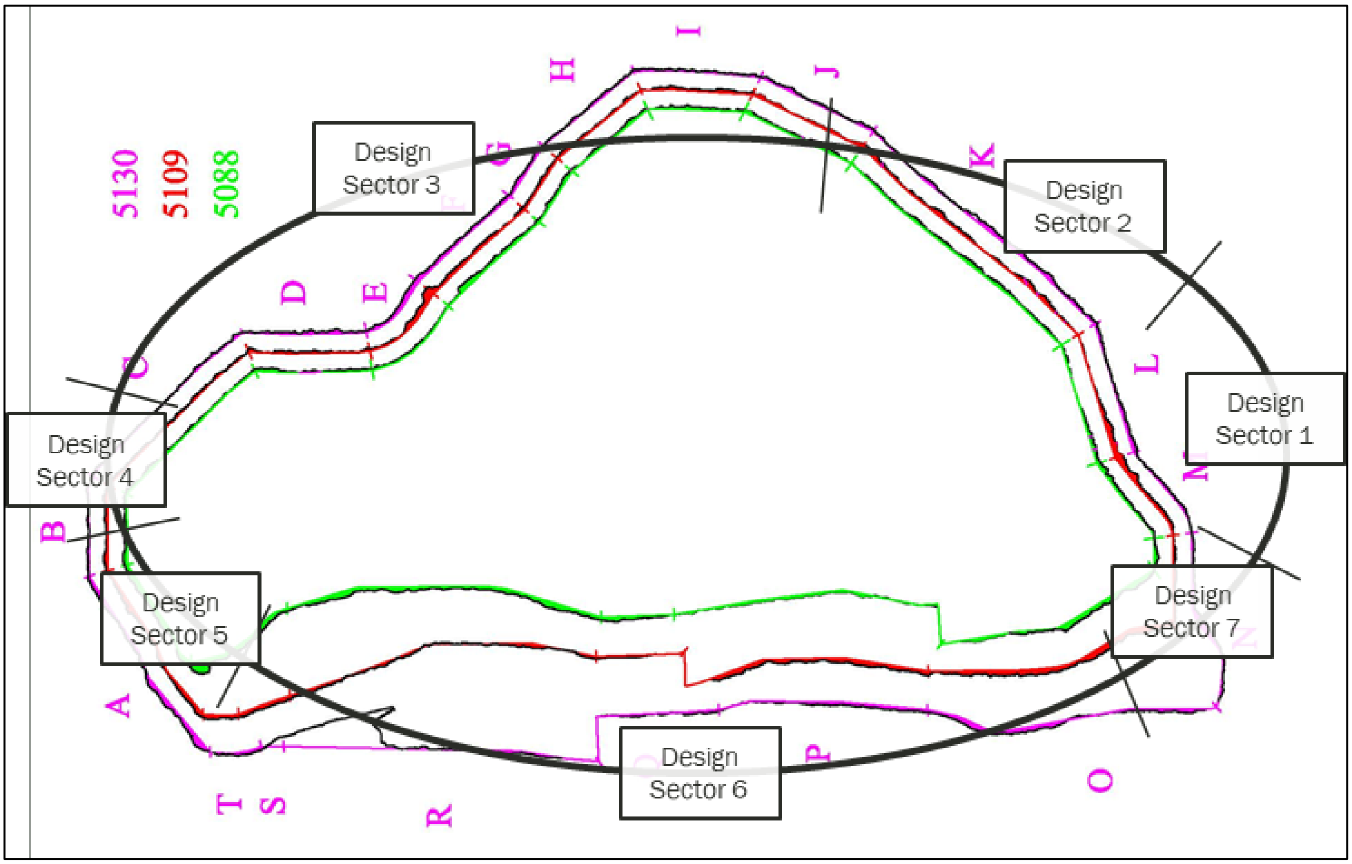


Figure 11: Back Break Study Analysis Locations and Pit Slope Design Sectors (Source: Agnico 2017)

The results for the North, East, and South pit highwall are presented in the following table and are compared where possible with the general predictions of back break from the 2013 study, based on data collected from oriented geotechnical drill holes.

Table 4-2: Comparison of Vault Pit Back Break Analysis (2017) with Predicted Performance (2013)

Back Break Analysis Location (2017)	Relative Affected 2013 Design Sector	General Location Description	Average Actual Back Break, 2017 (m)	Predicted Back Break, 2013 (m)			
				Planar		Wedge	
				Mean (m)	Max (m)	Mean (m)	Max (m)
A	4,5	North Wall	2.6	0.7-4.6	2.2-5.0	1.2-1.3	3.0-3.3
B	4,5	North Wall	1.6	0.7-4.6	2.2-5.0	1.2-1.3	3.0-3.3
C	4,5	East Highwall (Southwest Facing)	1.1	0.7-4.6	2.2-5.0	1.2-1.3	3.0-3.3
D	3	East Highwall (Southwest Facing)	1.6	1.1-1.9	2.8-5.0	1.2	3.0-3.1
E	3	East Highwall (Southwest Facing)	2.2	1.1-1.9	2.8-5.0	1.2	3.0-3.1
F	3	East Highwall (Southwest Facing)	2.1	1.1-1.9	2.8-5.0	1.2	3.0-3.1
G	3	East Highwall (Southwest Facing)	1.8	1.1-1.9	2.8-5.0	1.2	3.0-3.1
H	3	East Highwall (Southwest Facing)	1.2	1.1-1.9	2.8-5.0	1.2	3.0-3.1
I	3	East Highwall (Southwest Facing)	1.5	1.1-1.9	2.8-5.0	1.2	3.0-3.1
J	3	East Highwall (Northwest Facing)	1.4	1.1-1.9	2.8-5.0	1.2	3.0-3.1
K	2	East Highwall (Northwest Facing)	1.7	1.1-1.9	2.8-5.0	1.2-1.3	3.0-3.1
L	2	East Highwall (Northwest Facing)	1.8	1.1-1.9	2.8-5.0	1.2-1.3	3.0-3.1
M	2	East Highwall (Northwest Facing)	1.9	1.1-1.9	2.8-5.0	1.2-1.3	3.0-3.1
N	1	South Wall	1.7	No Data	No Data	No Data	No Data
O	6	West Footwall Slope	2.7	N/A	N/A	N/A	N/A
P	6	West Footwall Slope	1.8	N/A	N/A	N/A	N/A
Q	6	West Footwall Slope	1.4	N/A	N/A	N/A	N/A
R	6	West Footwall Slope	1.8	N/A	N/A	N/A	N/A
S	6	West Footwall Slope	2.8	N/A	N/A	N/A	N/A
T	6	West Footwall Slope	3.7	N/A	N/A	N/A	N/A

The results of the footwall assessment are not particularly informative as the footwall slope was designed to a single-bench configuration to actively manage undercutting of the east dipping foliation along which sliding, raveling, and back break was expected, and where the foliation is inclined greater than about 34 degrees.

The average back break based on Agnico's assessment of the active pit walls in 2017 study for the North, East, and South walls, and excluding the results of the West Footwall Slope, is 1.7 m. The bench scale and highwall performance of the current walls in the Vault Pit, in terms of back break, is consistent with the predicted average planar and wedge back break estimated by the 2013, and demonstrates conformance with the original design criteria and performance expectations as based on the engineering geological model for the deposit.

Based on the assessment of the current Vault Pit bench back break and bench performance, similar performance can be expected for the Phaser and BB Phaser Pit pushback.

5.0 CONCLUSIONS

Agnico Eagle have adopted the design criteria of the main Vault Pit to apply to the proposed Phaser Pit and BB Phaser Pit. The proposed pits are a pushback of the main Vault Pit south-southwest wall. Tetra Tech is familiar with the history and design of the main Vault Pit, and has reviewed the available and new data. Tetra Tech concludes that it is reasonable and appropriate to adopt the existing Vault Pit slope design criteria for use in the development and mining of the two pits.

This conclusion is based on the following summary of the key points described in the main body of this letter report:

- The proposed pits are a pushback of the existing Vault Pit south wall, extending approximately southwest along strike of the known foliation/stratigraphy and structure. As such, similar structure and geology to the main Vault Pit are expected.
- The walls of the main Vault Pit have performed well since 2014. The current east highwall is approximately 80 to 100 m in height, and there are no significant rock mass strength, stress, or structurally related instabilities in the existing pit. An ice wall that forms annually from the upper benches of the south through east pit wall is related to on-going draining of the Vault Lake talik, and is unrelated to rock mass strength or stress.
- A review of the back break study for the current Vault Pit benches shows that the actual performance is generally consistent with the predicted performance from studies during the design phase for the pit. Consequently, similar bench performance is expected for the Phaser and BB Phaser pits.
- The evolution of the structural model used to develop the original and optimized slope design criteria for the main Vault Pit was reviewed and compared to recent preliminary stereographic data interpreted from a LiDAR scan of the initial stripping at the Phaser Pit. The review and comparison indicates that the general structural model for the Vault Deposit continues to be applicable to the pushback area for the Phaser and BB Phaser Pits.
- The rock type and structure that will be exposed in the pit walls of the Phaser Pit and BB Phaser Pit is consistent with that exposed in the main Vault Pit. The rock types that will be exposed in the Phaser Pit and BB Phaser Pit will be of sufficient strength that rock mass failure or stress related failure are unlikely. The performance of the pit benches and the shallow overall pit slopes will be dependent on the rock structure.
- The pits are shallow to maximum highwall heights of about 40 to 50 m (excluding the overburden slopes at the wall crests). The highwall and end walls will be mined to a triple-bench configuration (on 7 m single benches) while the footwall (east-southeast facing) slope will be mined to a single bench configuration to manage undercutting of the foliation and stratigraphy, with associated planar failures. Both the triple-benched highwall

and single-benched footwall have proven effective for managing raveling and material accumulation in the main Vault Pit.

- Areas of the pits will be excavated within the footprint of the former Phaser Lake. Based on bathymetry the lake depths in these areas of the pits was less than 1 to 2 m. Consequently, the development of a significant talik beneath the former lake in these areas is not expected, and inflows to the pits is expected to be minor. The development of groundwater pressure that could affect bench and wall stability is not considered a significant risk for the low pit walls.

5.1 Operational Considerations

The rock mass quality that is expected to be exposed in the Phaser Pit and BB Phaser Pit is anticipated to be similar to the main Vault Pit, which can generally be classified as Good Quality Rock. The performance of the current Vault Pit is compliant with the expected performance, as presented in previous studies. The performance of the proposed Phaser and BB Phaser pits is expected to be similar to that of the main Vault Pit. However the first bench in bedrock should be expected to be strongly fractured due to freeze/thaw effects, and due to blast damage resulting from poor confinement of the initial sinking cut and subsequent blasts. Additional raveling of material of the first bench may occur, however this is expected to be contained on the first bench, as with the main Vault Pit.

A review of the overburden slope design is not part of this scope. It is expected that the same design criteria that Agnico have successfully used elsewhere will be applied in terms of overburden slope angle, and thermal capping.

Agnico have indicated that during mining of the Phaser and BB Phaser pits, the walls will be mapped regularly and the structure compared to the known structure within the existing Vault Pit to confirm and validate the assumptions on which the applied design criteria are based. This observational approach will be used to adapt mining to actual conditions as the walls are exposed. This is a sound and logical approach given the small size of the pits, and given the current understanding of the Vault Deposit area and current pit performance. However, if during the initial phases of construction the actual conditions deviate significantly from the conditions that are currently expected, then Agnico should re-evaluate the slope design criteria at that time.

6.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Agnico Eagle Mines Ltd and their agents. Tetra Tech Canada Inc. (operating as Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Agnico Eagle Mines Ltd., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in the Appendix or Contractual Terms and Conditions executed by both parties.

7.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.

REGISTERED PROFESSIONAL ENGINEER
C. CLAYTON
LICENSEE
22 Nov 2017
NT/NU

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CC/CH/tak

PERMIT TO PRACTICE
TETRA TECH CANADA INC.
Signature
Date Nov. 23, 2017
PERMIT NUMBER: P 018
NT/NU Association of Professional Engineers and Geoscientists

APPENDIX A

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOTECHNICAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH's professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, TETRA TECH has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

1.8 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. TETRA TECH does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

1.9 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

1.10 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. TETRA TECH does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

1.11 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

1.12 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

1.13 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

1.14 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

1.15 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

1.16 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

1.17 SAMPLES

TETRA TECH will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

APPENDIX E

GROUND CONTROL MANAGEMENT PLAN – TABLE OF CONTENTS

MEADOWBANK GOLD PROJECT

Ground Control Management Plan

Prepared by:
Agnico Eagle Mines Limited – Meadowbank Division

Version 0
January 2017

GROUND CONTROL MANAGEMENT PLAN

MEADOWBANK GOLD PROJECT

AGNICO EAGLE MINES LIMITED

This Ground Control Management Plan (GCMP) has been prepared by Agnico Eagle Mines Limited and is to be used to safely conduct mining operations at the Meadowbank Gold Project. All Registered Manual Holders are responsible for ensuring that they are using the most recent revision of this document. This Ground Control Management Plan may not be copied in whole or in part without the written consent of Agnico Eagle Mines Limited.

IMPLEMENTATION SCHEDULE
This Plan is immediately implemented.

DISTRIBUTION LIST

AEM- General Mine Manager

AEM- Mine Operations Superintendent

AEM- Engineering Superintendent

AEM- Health and Safety Superintendent

GCMP REVISION CONTROL

Version	Date (YMD)	Section	Page	Revision
V0	January 2017	All	All	

Approved by:

Bertin Paradis
Mine Manager

2017/03/07
Julie Belanger
Engineering Superintendent

Yan Cote
Mine Superintendent

for Norm Ladouceur
Normand Ladouceur
Health and Safety Superintendent

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APPENDIX F

ROCKFALL RECORDS

TETRA TECH

ROCKFALL LOG - Table 1

Date of Rock fall	Time	Exact Time ?	Pit	Location	Rock type	Easting	Northing	Elevation	Reported by	Estimated tonnage	Calculated tonnage (MAPTEK)	Reported to mine Inspector	Predicted by radar	Comment
1/29/2015	9:00		E3	West wall - South Ramp		1802	5984	5077	Engineering personnel		410	Yes	No radar yet	
5/22/2015	Between May 21 - 20h17 & May 22- 02h05		E3	West wall - South Ramp (below)		1843	5990	5059	Pit personnel	10		No	No radar yet	Large ammount of material scaled after rock fell
6/7/2015	Day		E3	West wall - South Ramp		1812	5961	5066	Pit personnel	<10		No	No radar yet	
6/13/2015	14:30		E3	West wall - South Ramp		1812	5961	5066	Pit personnel		120	Yes	No	
6/14/2015	21:00		E3	South Wall		2024	5690	5084	Pit personnel	40		No	No	
6/21/2015	23:50		E3	West wall - South Ramp		1760	6131	5090	Pit personnel		95	Yes	No	
6/24/2015	7:05		E3	South Wall		2024	5690	5084	Pit personnel		275	Yes	No	
6/25/2015	12:05		E3	West wall - South Ramp		1820	5941	5065	Pit personnel	30		No	No	Large ammount of material scaled after rock fell
6/25/2015	Night		E3	South Wall		2024	5690	5084	Pit personnel		177	Yes	No	
6/27/2015	7:55		E3	South Wall		2024	5690	5084	Pit personnel		30	No	No	
6/28/2015	1:10		E3	South Wall		2024	5690	5084	Night shift Operator		<10	No	No	
6/29/2015	13:30		E3	South Wall		1991	5652	5087	Rock Mechanic Eng (witness)		39	No	No	
6/29/2015	Night		Vault	West Wall		3018 (estimated)	4739 (estimated)	5116 (estimated)	Pit personnel	<10		No	No	
6/30/2015	7:00		E3	South Wall		1984	5655	5080	Pit personnel		76	Yes	No	
7/6/2015	7:00	Yes	E3	South Wall		2007	5673	5084	Pit personnel		1770	Yes	No	
7/7/2015	10:44	Yes	E3	East Wall					Pit personnel		350	Yes	Blind Spot	
7/9/2015	0:45		E3	South Wall					Pit personnel		550	Yes	No	
7/15/2015	2:00		E3	South Wall					Pit personnel		650	Yes	Yes	
7/21/2015	21:30	No	E3	South Wall					Pit personnel		1440	Yes	Yes	

LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Rockfall Log – Table 1

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	CJC

OFFICE	DATE
VANCOUVER	DECEMBER 2017

Figure F-1

TETRA TECH

ROCKFALL LOG - Table 2

Date of Rock fall	Time	Exact Time ?	Pit	Location	Rock type	Easting	Northing	Elevation	Reported by	Estimated tonnage	Calculated tonnage (MAPTEK)	Reported to mine Inspector	Predicted by radar	Comment
7/27/2015	22:05	No	E3	South Wall					Engineering personnel		499	Yes	Yes	
8/3/2015	10:03	Yes	E3	South Wall					Pit personnel		7500	Yes	Yes	
8/7/2015	15:36	Yes	E3	South Wall					Pit personnel		2500	Yes	Yes	
8/9/2015	11:07	Yes	E3	South Wall					Pit personnel		1650	Yes	Yes	
8/22/2015	10:50	Yes	E3	South Wall					No Pit Personnel. Radar alarms showed us		115	Yes	Yes	
8/30/2015	0:45	No	E3	South Wall					No Pit Personnel. Radar alarms showed us		5	No	Yes	
8/31/2015	2:30	No	E3	South Wall					No Pit Personnel. Radar alarms showed us		950	Yes	Yes	
9/21/2015	16:31	Yes	E3	South Wall					Pit personnel		9200	Yes	Yes	On video
6/1/2016	12:00	No	Vault	North					Pit personnel		30	No	Not monitored	
6/19/2016	12:00	No	A	East Wall - ramp	Intermediate Volcanic				Pit personnel		29	No	Not monitored	Contained within safety berm; At the junction of 2 pit designs
7/1/2016	21:00	No	A	West wall	Ultramafic				Pit personnel		134	Yes	Not monitored	Rain in the evening
7/3/2016	7:30	No	A	West	Ultramafic				Pit personnel - Witnessed		393	Yes	Not monitored	
7/4/2016	8h30	No	A	West Wall	Ultramafic				Pit personnel		722	Yes	Not monitored	
7/8/2016	06h00	No	A	West wall	Ultramafic				Pit personnel		25	No	Not monitored	
7/27/2016	8h30	No	A	East - Ramp	Intermediate Volcanic				Pit personnel - Witnessed		337	Yes	Not monitored	Just beside backhoe doing hammer
9/24/2016	20h00	No	A	West wall	Ultramafic				Pit personnel	100		Yes	Not monitored	On working platform (mucking bench)
9/25/2016	14h00	No	A	West wall	Ultramafic				Pit personnel		4265	Yes	Not monitored	Upper bench
6/16/2017	1h00	No	E5	South Wall	Intermediate Volcanic				Pit personnel	350	350	Yes	Not monitored	
6/17/2017	12h00	no	E5	South Wall	Ultramafic				Pit personnel	300		yes	No	
6/17/2017	4h00	No	A	North east	Intermediate Volcanic				Pit Personnel	179		yes		
6/19/2017	10h25	No	E5	South East wall	Ultramafic				Pit Personnel		337	Yes	Yes	
6/19/2017	21h30	No	E5	South East wall	Ultramafic				Pit Personnel		172	Yes	Yes	
7/7/2017	8h40	Yes	Vault	East wall	Ice				Pit Personnel		385	yes	Not monitored	ice fall, not rock
7/17/2017	Unknown	No	E5	South East wall	Ultramafic				Visual inspection	60		yes	no	New material observed on catchbench. Fell between July 15th and 17th.

LEGEND

NOTES

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AGNICO EAGLE
MEADOWBANK

TETRA TECH

MEADOWBANK MINE
ANNUAL PIT WALL INSPECTION

Rockfall Log – Table 2

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	CJC

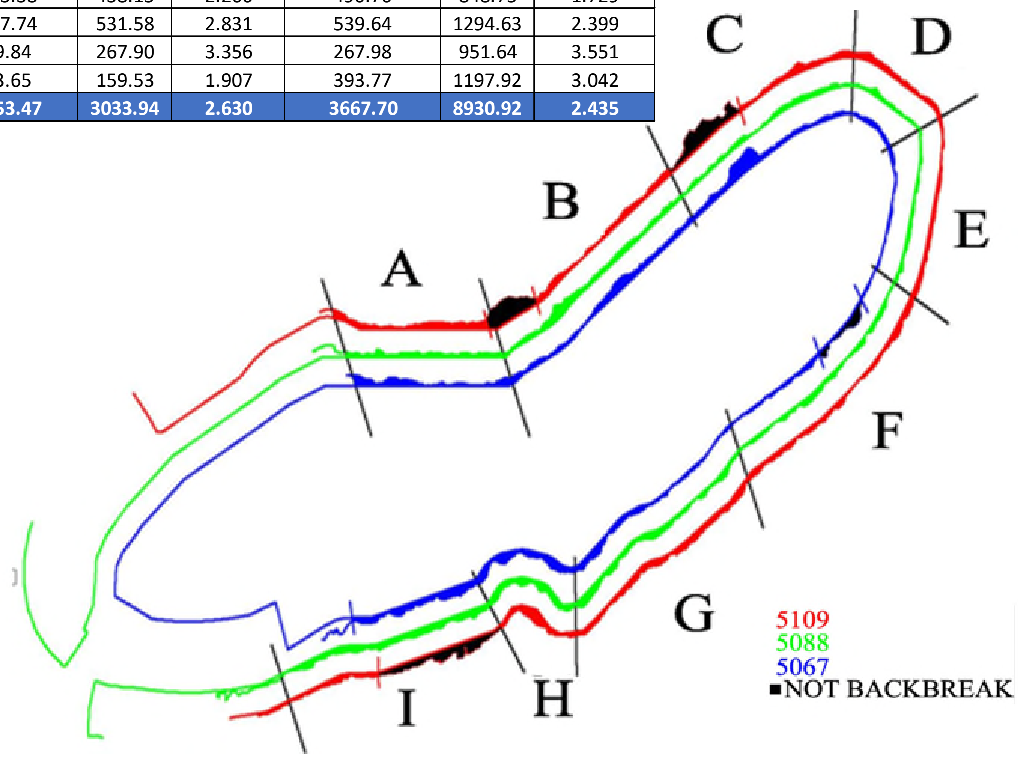
OFFICE	DATE
VANCOUVER	DECEMBER 2017

Figure F-2

APPENDIX G

BACK BREAK ANALYSIS

Section	CATCH BENCH ELEVATION									Average per Sections		
	5067			5088			5109					
	Length_PD (m)	Area(m^2)	Average back break (m)	Length_PD (m)	Area (m^2)	Average back break (m)	Length_PD (m)	Area (m^2)	Average back break (m)	Length_PD (m)	Area (m^2)	Average back break (m)
A	142.52	345.86	2.427	142.88	361.62	2.531	141.57	486.88	3.439	426.97	1194.36	2.797
B	196.32	511.30	2.604	192.86	521.93	2.706	148.39	355.09	2.393	537.57	1388.32	2.583
C	160.64	567.75	3.534	172.78	296.90	1.718	109.41	292.84	2.677	442.83	1157.50	2.614
D	102.98	81.50	0.791	67.66	98.34	1.454	87.97	251.93	2.864	258.61	431.77	1.670
E	83.57	71.72	0.858	104.49	144.29	1.381	121.51	250.03	2.058	309.57	466.04	1.505
F	116.30	117.58	1.011	181.08	293.01	1.618	193.38	438.15	2.266	490.76	848.75	1.729
G	171.14	304.88	1.782	180.76	458.16	2.535	187.74	531.58	2.831	539.64	1294.63	2.399
H	97.62	370.63	3.797	90.52	313.11	3.459	79.84	267.90	3.356	267.98	951.64	3.551
I	115.66	425.69	3.680	194.46	612.70	3.151	83.65	159.53	1.907	393.77	1197.92	3.042
TOTAL	1186.75	2796.92	2.357	1327.48	3100.06	2.335	1153.47	3033.94	2.630	3667.70	8930.92	2.435



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

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CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

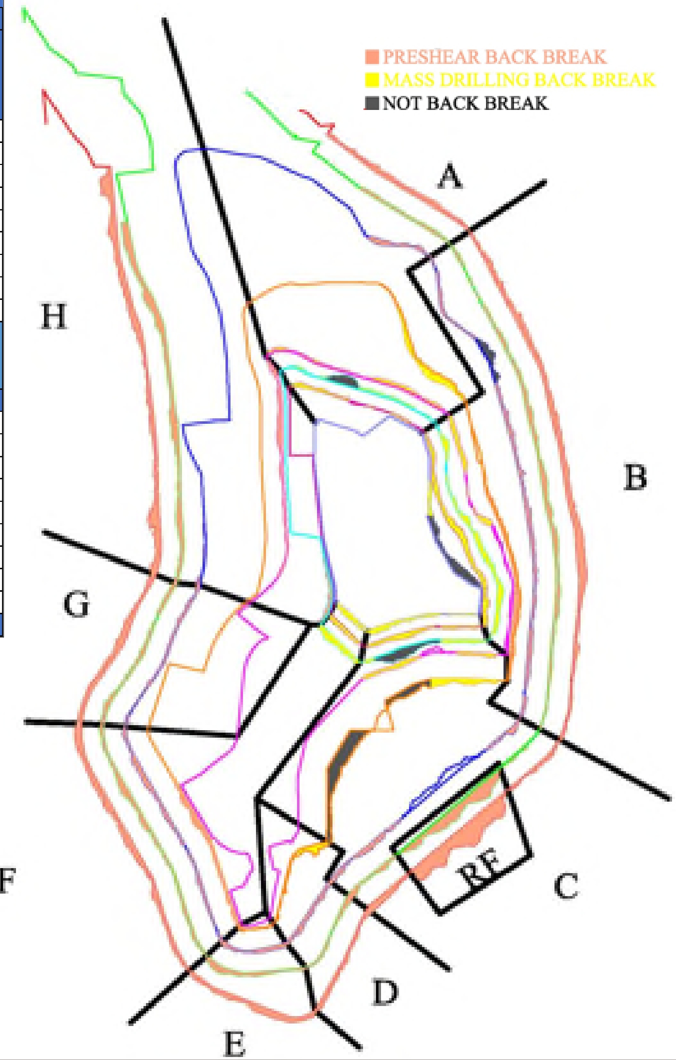
Portage Pit A Back Break Analysis 5067, 5088, 5109 Benches

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure G-1

TYPE	SECTION	CATCH BENCH ELEVATION								
		5011			5018			5025		
		Length_PD (m)	Area (m^2)	Average back break (m)	Length_PD (m)	Area (m^2)	Average back break (m)	Length_PD (m)	Area (m^2)	Average back break (m)
PRESHEARED	A	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	B	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	C	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	D	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	E	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	F	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	G	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	H	0.00	0.00	0.000	0.00	0.00	0.000	62.37	129.01	2.068
	RF	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	TOTAL WITHOUT RF	0.00	0.00	0.000	0.00	0.00	0.000	62.37	129.01	2.068
	TOTAL	0.00	0.00	0.000	0.00	0.00	0.000	62.37	129.01	2.068
MASS DRILLED	A	0.00	0.00	0.000	113.56	70.28	0.619	105.44	114.34	1.084
	B	28.19	42.10	1.493	267.78	352.33	1.316	189.88	345.45	1.819
	C	92.25	117.55	1.274	267.78	142.57	0.532	49.08	72.24	1.472
	D	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	E	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	F	34.46	76.91	2.232	37.82	61.02	1.613	43.96	138.37	3.147
	G	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	H	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	RF	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	TOTAL	154.89	236.56	1.527	686.95	626.21	0.912	388.36	670.39	1.726



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

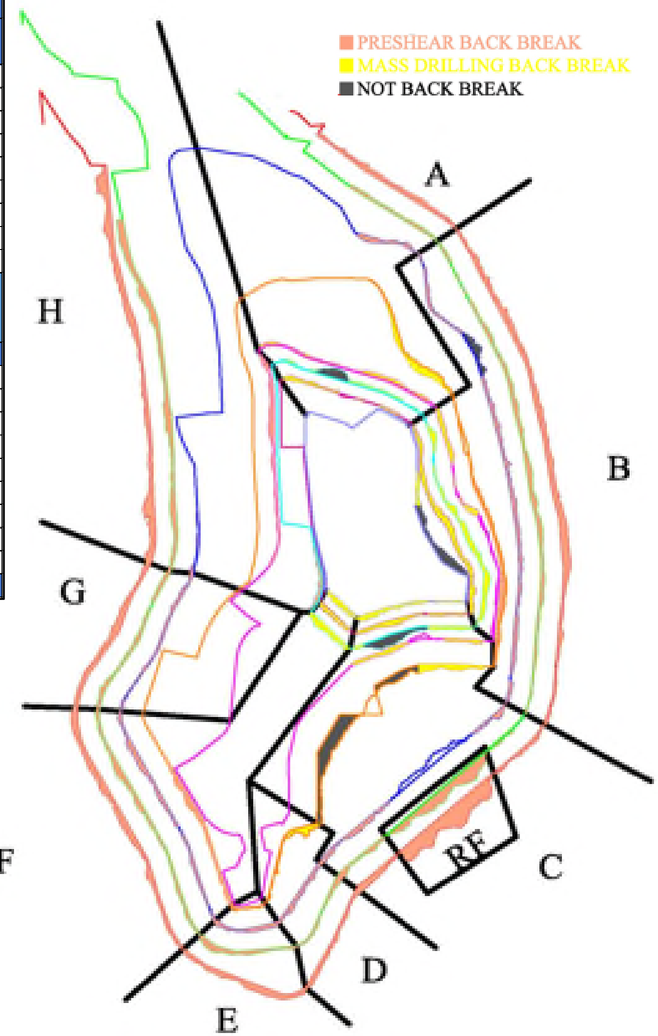
Portage Pit E Back Break Analysis 5011, 5018, 5025 Benches

TETRA TECH

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00
OFFICE	DATE			
VANCOUVER	DECEMBER, 2017			

Figure G-2

TYPE	SECTION	CATCH BENCH ELEVATION								
		5032			5046			5067		
		Length_PD (m)	Area (m^2)	Average back break (m)	Length_PD (m)	Area (m^2)	Average back break (m)	Length_PD (m)	Area (m^2)	Average back break (m)
PRESHEARED	A	0.00	0.00	0.000	0.00	0.00	0.000	54.19	96.03	1.772
	B	0.00	0.00	0.000	180.48	374.37	2.074	357.17	458.55	1.284
	C	0.00	0.00	0.000	0.00	0.00	0.000	113.30	195.48	1.725
	D	0.00	0.00	0.000	56.86	46.38	0.816	60.79	115.00	1.892
	E	0.00	0.00	0.000	28.22	27.96	0.991	52.38	102.85	1.963
	F	0.00	0.00	0.000	125.27	238.61	1.905	191.65	251.83	1.314
	G	0.00	0.00	0.000	0.00	0.00	0.000	130.10	100.86	0.775
	H	182.23	254.96	1.399	0.00	0.00	0.000	51.59	48.92	0.948
	RF	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	TOTAL WITHOUT RF	182.23	254.96	1.399	390.83	687.32	1.759	1011.16	1369.53	1.354
	TOTAL	182.23	254.96	1.399	390.83	687.32	1.759	1011.16	1369.53	1.354
MASS DRILLED	A	156.75	244.27	1.558	125.55	301.39	2.401	0.00	0.00	0.000
	B	101.86	140.21	1.376	0.00	0.00	0.000	0.00	0.00	0.000
	C	118.09	143.51	1.215	60.21	156.51	2.600	0.00	0.00	0.000
	D	0.00	0.00	0.000	30.40	124.86	4.108	0.00	0.00	0.000
	E	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	F	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	G	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	H	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	RF	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	TOTAL	376.70	527.98	1.402	216.15	582.77	2.696	0.00	0.00	0.000



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit E Back Break Analysis 5032, 5046, 5067 Benches

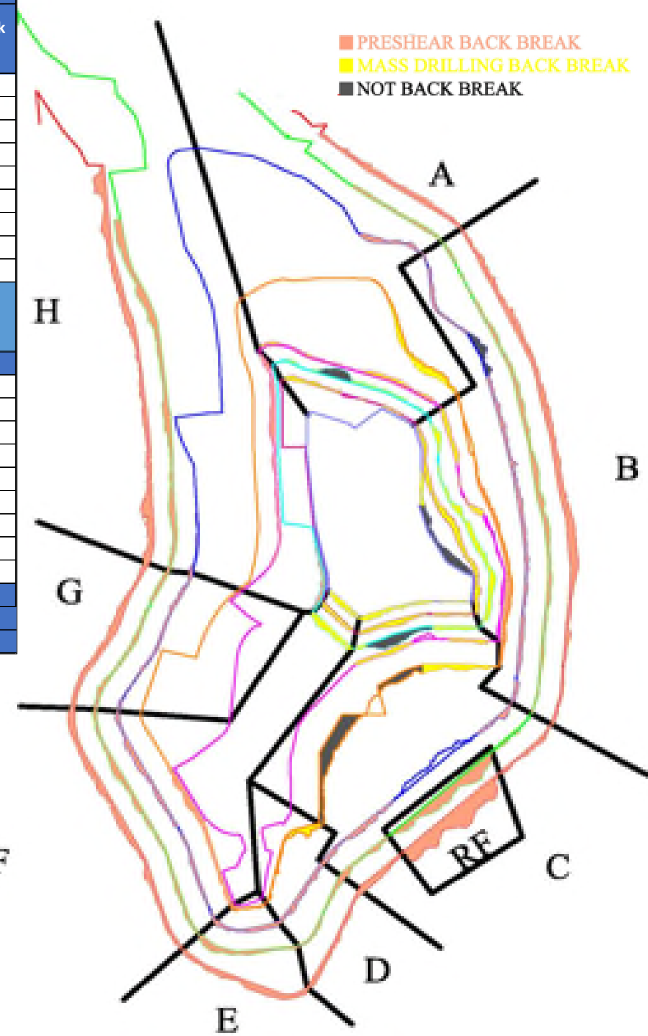
PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE: VANCOUVER

DATE: DECEMBER, 2017

Figure G-3

TYPE	SECTION	CATCH BENCH ELEVATION						AVERAGE PER SECTIONS		
		5088			5109					
		Length_PD (m)	Area (m^2)	Average back break (m)	Length_PD (m)	Area (m^2)	Average back break (m)	Length_PD (m)	Area (m^2)	Average back break (m)
PRESHEARED	A	84.12	97.64	1.161	137.11	277.10	2.021	275.42	470.77	1.709
	B	412.12	627.60	1.523	432.00	1040.43	2.408	1381.77	2500.96	1.810
	C	94.70	137.60	1.453	102.89	207.56	2.017	310.89	540.64	1.739
	D	69.52	85.79	1.234	92.49	145.65	1.575	279.66	392.83	1.405
	E	82.40	185.92	2.256	109.85	318.20	2.897	272.85	634.93	2.327
	F	206.79	346.06	1.674	220.69	601.04	2.723	744.39	1437.54	1.931
	G	129.97	196.23	1.510	135.92	362.64	2.668	396.00	659.74	1.666
	H	300.37	875.34	2.914	336.52	1054.53	3.134	933.07	2362.76	2.532
	RF	108.27	704.99	6.512	102.55	1052.46	10.262	210.82	1757.45	8.336
	TOTAL WITHOUT RF	1380.00	2552.19	1.849	1567.47	4007.15	2.556	4594.06	9000.16	1.959
	TOTAL	1488.27	3257.18	2.189	1670.03	5059.61	3.030	4804.88	10757.61	2.239
MASS DRILLED	A	0.00	0.00	0.000	0.00	0.00	0.000	501.30	730.28	1.457
	B	0.00	0.00	0.000	0.00	0.00	0.000	587.71	880.08	1.497
	C	0.00	0.00	0.000	0.00	0.00	0.000	587.40	632.38	1.077
	D	0.00	0.00	0.000	0.00	0.00	0.000	30.40	124.86	4.108
	E	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	F	0.00	0.00	0.000	0.00	0.00	0.000	116.24	276.30	2.377
	G	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	H	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	RF	0.00	0.00	0.000	0.00	0.00	0.000	0.00	0.00	0.000
	TOTAL	0.00	0.00	0.000	0.00	0.00	0.000	1823.05	2643.91	1.450
TOTAL WITHOUT RF								6417.11	11644.06	1.815
TOTAL								6627.93	13401.51	2.022



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

ISSUED FOR USE

CLIENT

AGNICO EAGLE MEADOWBANK

TETRA TECH

MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Portage Pit E Back Break Analysis 5088, 5109 Benches

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

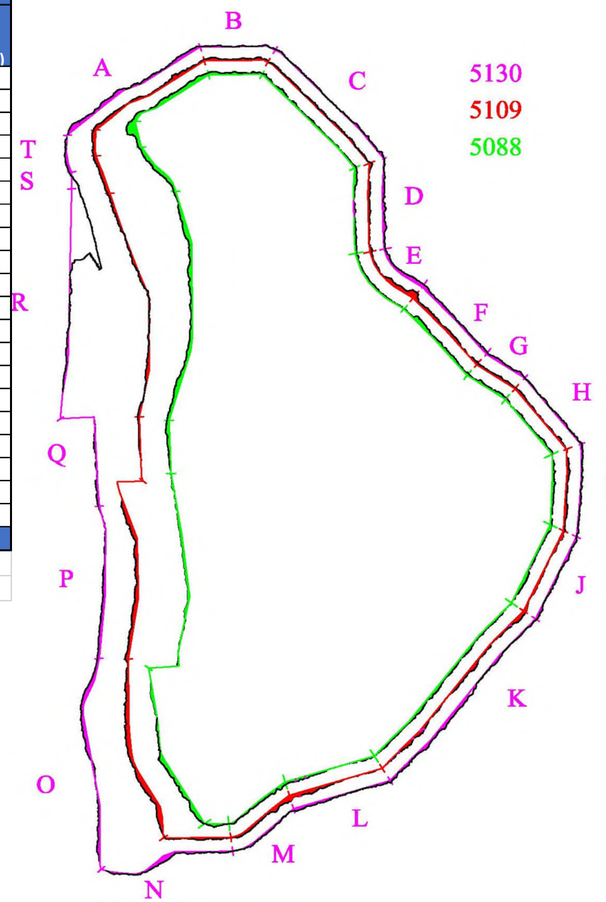
OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure G-4

Section	CATCH BENCH ELEVATION 5088 Length_PD (m)	5088 Area (m^2)	5088 Average back break (m)	5109 Length_PD (m)	5109 Area (m^2)	5109 Average back break (m)	5130 Length_PD (m)	5130 Area (m^2)	5130 Average back break (m)	Average per Sections Length_PD (m)	Average per Sections Area (m^2)	Average per Sections Average back break (m)
A	99.76	338.49	3.393	146.64	325.37	2.219	181.81	454.23	2.498	428.22	1118.09	2.61
B	59.77	134.24	2.246	71.62	161.35	2.253	82.26	54.27	0.660	213.65	349.86	1.64
C	150.01	194.98	1.300	163.91	194.86	1.189	175.71	147.46	0.839	489.63	537.30	1.10
D	99.18	167.11	1.685	102.79	147.22	1.432	104.99	181.84	1.732	306.96	496.17	1.62
E	87.31	106.70	1.222	74.96	217.01	2.895	63.41	173.03	2.729	225.68	496.74	2.20
F	104.55	233.96	2.238	104.97	229.00	2.182	106.01	214.09	2.019	315.53	677.04	2.15
G	51.10	100.43	1.965	51.27	82.99	1.619	51.04	99.87	1.957	153.41	283.29	1.85
H	82.41	119.38	1.449	90.89	113.24	1.246	99.26	97.03	0.978	272.57	329.65	1.21
I	81.72	141.01	1.726	94.56	171.96	1.819	107.53	122.28	1.137	283.81	435.25	1.53
J	100.55	176.65	1.757	103.19	125.35	1.215	105.61	144.91	1.372	309.35	446.91	1.44
K	235.09	355.49	1.512	241.79	416.01	1.721	248.67	431.05	1.733	725.55	1202.54	1.66
L	104.14	209.76	2.014	108.52	195.88	1.805	112.89	173.11	1.533	325.55	578.75	1.78
M	79.70	144.78	1.816	82.40	234.30	2.843	85.20	83.45	0.979	247.31	462.53	1.87
N	27.20	48.63	1.788	75.48	106.09	1.405	155.65	293.58	1.886	258.33	448.31	1.74
O	195.00	439.87	2.256	216.11	785.91	3.637	249.43	529.81	2.124	660.54	1755.58	2.66
P	226.31	214.05	0.946	210.19	605.53	2.881	177.86	310.86	1.748	614.36	1130.44	1.84
Q	61.66	142.95	2.318	49.81	61.29	1.230	103.71	106.90	1.031	215.18	311.13	1.45
R	271.73	820.50	3.020	268.15	328.26	1.224	169.16	113.72	0.672	709.04	1262.47	1.78
S	65.19	221.39	3.396	46.19	142.76	3.091	19.74	9.13	0.463	131.12	373.28	2.85
T	30.46	213.72	7.016	29.86	93.73	3.139	43.25	78.77	1.821	103.57	386.22	3.73
TOTAL	2212.87	4524.06	2.044	2333.307	4738.09	2.031	2443.186	3819.38	1.563	6989.36	13081.54	1.87

*Length_PD: length of pit design for this section/blast pattern along the catch bench

*Area: total area of backbreak for this section/blast pattern



LEGEND

NOTES

Data provided by Agnico Eagle Mines Ltd.

STATUS

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AGNICO EAGLE MEADOWBANK

TETRA TECH

MEADOWBANK MINE ANNUAL PIT WALL INSPECTION

Vault Pit Back Break Analysis 5088, 5109, 5130 Benches

PROJECT NO.	DWN	CKD	APVD	REV
704-ENG.ROCK03053-01	JV	CJC	CJC	00

OFFICE	DATE
VANCOUVER	DECEMBER, 2017

Figure G-5

APPENDIX H

TETRA TECH'S LIMITATION ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOTECHNICAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH's professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, TETRA TECH has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

1.8 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. TETRA TECH does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

1.9 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

1.10 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. TETRA TECH does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

1.11 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

1.12 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

1.13 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

1.14 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

1.15 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

1.16 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

1.17 SAMPLES

TETRA TECH will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

AGNICO EAGLE
MEADOWBANK

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